DOCUMENT RESUME

ED 169 691 EC 114 088

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TITLE Precision Measurement.
INSTITUTION Castro Valley Unified School District, Calif.
PUB DATE Nov 78
NOTE 74p.; Print is marginal and may not reproduce well in hard copy; For related information, see EC 073 347-349

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS *Charts; Elementary Secondary Education; *Handicapped Children; *Precision Teaching; Student Evaluation

ABSTRACT

The manual provides information for precision measurement (counting of movements per minute of a chosen activity) of achievement in special education students. Initial sections give guidelines for the teacher, parent, and student to follow for various methods of charting behavior. It is explained that precision measurement is a way to measure the results of teaching, to evaluate the teaching, and to guide necessary changes in teaching approaches. A paper by B. Tyler titled "Teaching Kids (And You) to Chart" briefly outlines 10 lesson plans on charting. Subsequent sections cover such areas as procedures for written daily timings, precision measurement and curriculum in language arts and mathematics, and suggested proficiency rates or goals. Appendixes, which make up half the document, consist of sample curriculum formats (student worksheets) that have been used in precision measurement projects in subjects which include sentence comprehension, early mathematics, and eye-hand coordination. (SBH)

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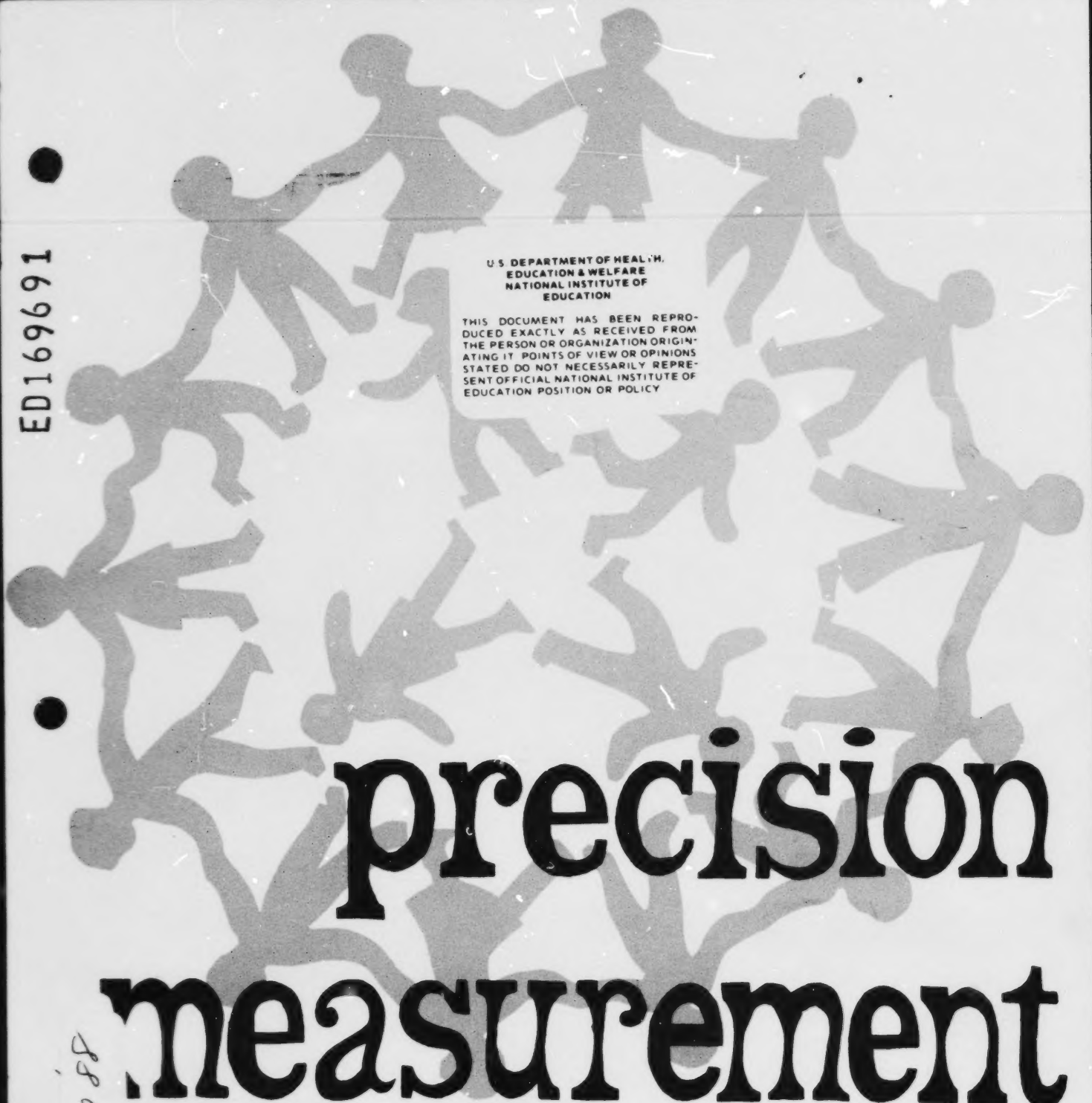

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Child Service Demonstration Center System

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11/78

ACKNOWLEDGEMENTS

This book owes its existence to the efforts of many people: To Barbara Tyler who wrote the original version of this book, to Ogden Lindsley and his associates who developed the theories and practices of Precision Teaching, especially to Elisabeth and Eric Haughton, Anne and Clay Starlin, and Ted Alper who have given so much assistance during the past nine years.

The feedback from the Team Learning Center Staff and Castro Valley teachers has been essential in evaluating the usefulness of the techniques and materials presented.

A thank you to the California Child Service Demonstration Center System, especially to Karl Murray and Anne TeSelle for their support.

We hope this material is helpful to its readers.

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TABLE OF CONTENTS

	Page No.
Introduction.	1
Precision Measurement Is...	
Behaviors That Can Be Counted May Be...	
The Originator...	
The Benefits are...	
The Teacher can...	
The Student Will...	2
The Parent Will...	
The Parent Will Have an Opportunity To...	
What We Have Done is...	
Adaptation of Lindsley's Logarithmic Monitoring Chart	3
Things You Can Chart Are...	4
Overview of Process	
Know How to Chart Before Beginning a Project	5
Terms Used in Charting	6,7
Phase Changes	8
Watching the Slope - Best Fit Lines	
Teaching Kids (and You) To Chart - By B. Tyler.	9
Materials Needed	
Vocabulary	
Suggested Lesson Plan Ideas - Lessons 1-3	
Lessons 4-9.	10
Lesson 10 (Reverse for deceleration projects)	
Use of the Aim Sheet.	11
Student Charts and Folders	
Ideas For Storage in the Classroom of Precision Teaching Materials	
Sample Adapted Logarithmic Chart - Says Sounds Correctly.	12
Sample Aim Sheet - Sounds Said Correctly by Student	13
Sample Aim Sheet - Math Facts Correct	14
Sample Adapted Logarithmic Chart - Writes Math Facts Correctly.	15
General Procedure to Follow with Written Daily Timings.	16
Answer Sheets	17
Procedures for Oral Timings	
Precision Measurement and Curriculum.	18
Language Arts - Reading: Alphabet Names	
Sound/Symbol Sheets.	19
Word Lists	
Context	
Vocabulary Enrichment	
Pre-reading	
Handwriting	20
Spelling	
Mechanics	

Page No.

Precision Measurement and Curriculum (continued)

Mathematics - Number Sheets 20
Concepts
Computation

Addition. 21
Subtraction
Multiplication

Division. 22
Other Math Projects
Where Should Each Child Begin

Ideas for Setting Goals 23

Team Learning Center Recommended Mastery Rates - Written Data. 24

Reading Curriculum Breakdown that Can Be Used with Precision Measurement 25
Letter Sounds Said Correctly
Consonants

Consonant Blends and Digraphs, Vowels Sounds, Blending Project, Word Lists. 26

Oral Reading, Silent Reading, Other Reading Projects 27

Suggested Proficiency Rates or Goals 27

Team Learning Center Individual Rated Inventory Recommended Mastery Rates 28

APPENDICES - Sample Curriculum Formats — Appendix

Alphabet Names - Cursive. . . . . A
Introductory Sounds . . . . . B
Consonant Sounds. C
Basic Word List - Dolch, Level I. . . . . D
Survival Vocabulary - Sections I through V. . . . . DD-a
" " " VI through X . . . . . DD-b
Precision Measurement and Context - Cloze Technique . . . . . E
Sentence Comprehension - Yes or No Sentences - Level 1. . . . . F
Sentence Comprehension - Can You..... ? . . . . . G
Sentence Comprehension - Words circled correctly. . . . . H
Prefixes and Suffixes I
Reading Numbers Orally - Out of Sequence 0 - 20 . . . . . J
One-to-one Correspondence - Circle Matching Sets. . . . . K
Early Math - Matching: Circle number that matches the dots. L
Early Math - Matching: Circle set that matches the number . . . . . M
Early Math - Counting Dots: Write the No. Name for each set . . . . N

Addition Facts - +3 . . . . . O
- Mixed + 0 - 10. . . . . OO
Subtraction Facts - 2 Place Borrowing . . . . . P
- 3 Place, No Borrowing . . . . . PP
Multiplication - x 3. . . . . Q
- Mixed x 0 - 7. . . . . QQ
Division - ÷ 7. . . . . R
Fractions - Addition of Proper Fractions. . . . . S
- Proper Fraction 3/4. . . . . SS
Colors - Student Names Colors Correctly (Univ.of Washington) . . . T
- Student Correctly Points to Named Color (Univ.of Wash.). . TT
Eye-Hand Coordination . . . . . U
Traces Letters - Connecting 0 to x (Univ. of Washington). V
Traces Numbers - Starting at x. . . . . W

PRECISION MEASUREMENT

INTRODUCTION

The purpose of this Precision Measurement Manual is to give you, the reader, some information and help in selecting an appropriate precision measurement design and successfully putting it in action. When you begin charting, you will be surprised by the amount of new knowledge and awareness you discover as you do the timings and look at the results.

PRECISION MEASUREMENT IS....

a counting of movements per minute of a chosen activity (behavior). The counting is done daily and the number of movements is recorded on a special chart for you and the person being counted to see, discuss and evaluate performance.

THE BEHAVIORS THAT CAN BE COUNTED MAY BE....

an academic behavior, such as writing numbers or saying words; or a social behavior such as smiling or saying "thank you." The student may choose to count an "inner" behavior such as feeling of success. In addition to outer behaviors, an inner behavior can also be counted, e.g., a teacher recording her number of positive thoughts about her class.

THE ORIGINATOR ..

Precision Measurement, as presented here, is based on the work originated by Dr. Ogden Lindsley at the University of Kansas. Dr. Lindsley's Precision Teaching was used mainly in special education, and many have recognized the value of the practical assistance the technique offers to teachers.

The Benefits are....

The teacher, parent and child have a recording technique which they can all use and understand. When the student realizes the concept of accelerating his learning rate, he can get interested in the behaviors he will need to have mastered and can get involved in the selection of his curriculum. More will be said about this in the chapters on curriculum.

The Teacher can....

1. Pinpoint academic strengths and weaknesses for an individual student and for the entire class.
2. Place each student on a success level in basic academic tasks.
3. Keep consistent, comparable records for the entire year that can be communicated clearly to parents or other educators. The chart is a record that is available for conference.
4. Give realistic, positive reinforcement for the student's correct performance and progress.
5. Measure the effectiveness of curriculum and teaching methods.

THE STUDENT WILL....

1. Get immediate feedback on daily performance.

2. Chart his own performance, so that he can see and feel his own growth and be able to show the charts and to explain them to parents and visitors. (Some of the proudest students that the authors have ever seen are students who are explaining their charts. They have done well and they know it.)

3. Realize his/her uniqueness and compete with own previous score rather than with peers.

4. Overcome feelings of fear and avoidance about his/her being timed or being tested.

5. Be involved in making curriculum decisions.

THE PARENT WILL....

receive information about their child's performance that is accurate, specific and up-to-date.

THE PARENT WILL HAVE AN OPPORTUNITY TO.....

participate in the learning process by charting an academic behavior, or an at-home goal of a social behavior.

Chart a behavior of their own to assist them in self-awareness and consistency in their parenting function.

WHAT WE HAVE DONE IS...,

In order to offer a practical version of Precision Teaching, we have shifted the emphasis slightly. Our experiences with this technique have suggested that the name, "Precision Measurement" is more appropriate because this process is not a teaching or curriculum approach. Precision Measurement is a way to measure the results of teaching, to evaluate the teaching and to guide necessary changes in the teaching approaches.

Daily monitoring is important. The teacher and the student need the visual feedback that a chart will give. The chart must show not only the information that a behavior has accelerated (increased) or decelerated (decreased) but it must give a visual picture of the rate of improvement.

A logarithmic chart will do this and a line chart will not. The chart paper developed by Lindsley is the most precise and is available through Behavior Research Co., P. O. Box 3351 - Kansas City, Kansas, 66103.

Many people have blown up sections of this chart to make it easier to reproduce and easier for students to keep their own records. See Figure 1 for an adaptation of the original logarithmic chart. This chart paper is most practical to record the number of behaviors occurring in one minute.

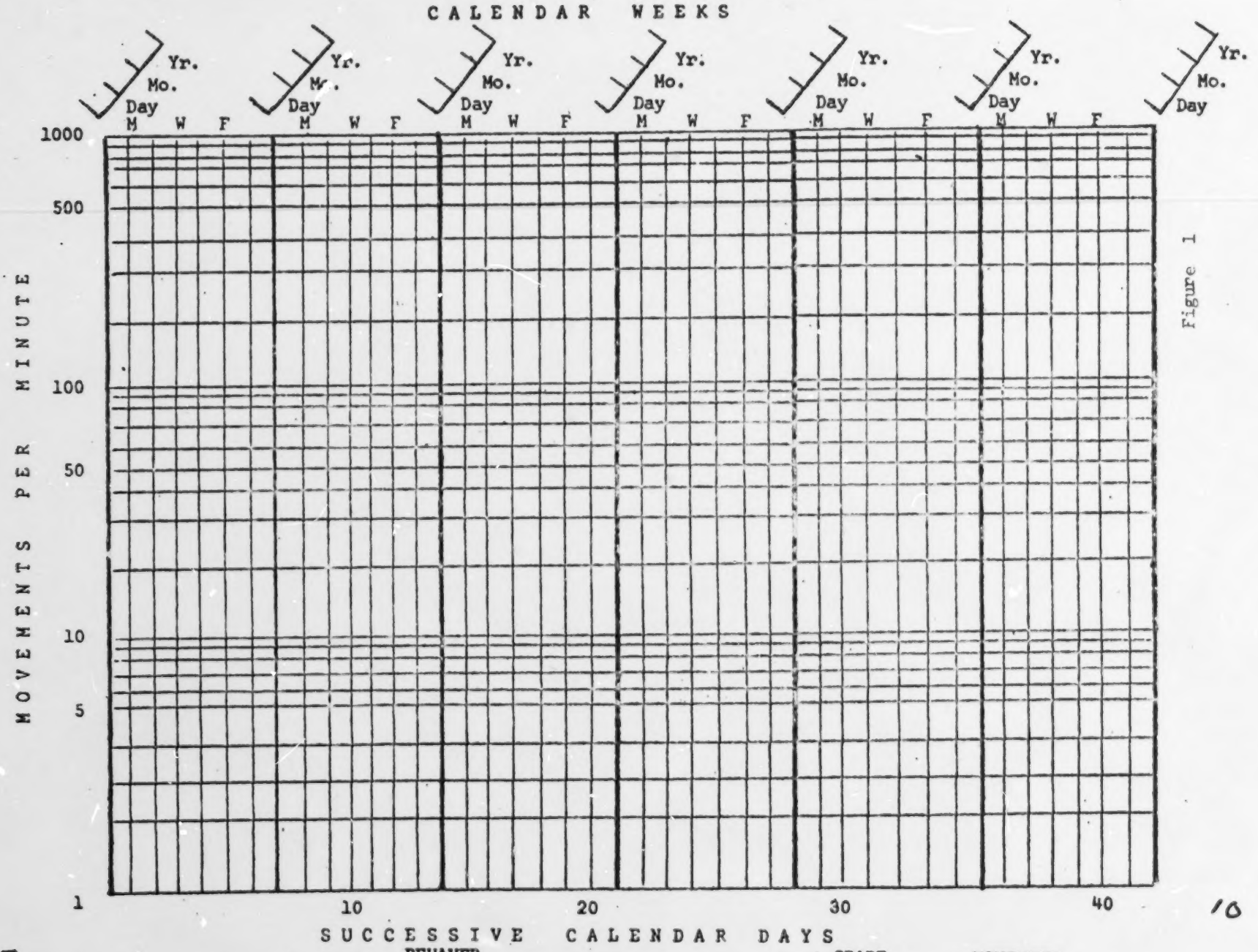


Figure 1

NAME: _____ BEHAVER _____ GRADE _____ MOVEMENT _____

We encourage the use of one minute timings for academic behaviors. The one minute sample is easier to organize and to accomplish each day. The count is easier to record on the chart. One minute has been found to be a fair time period for a student; allowing the student enough time to produce the behaviors but not so much time that the student becomes fatigued, causing the number of behaviors to be reduced.

The chart can be altered to count social behaviors over longer periods of time. To do this, you would change the vertical notation Movements Per Minute to Movements per the time period you have selected, i.e., Movements per 10 minutes.

THINGS YOU CAN CHART ARE. . .

Any behavior that you are going to count must meet three criteria. A behavior must:

1. be OBSERVABLE

2. be COUNTABLE

3. have A START and AN END

For example, sitting in a chair is observable, but it does not have a start and an end, and therefore is not countable.

A behavior that meets the three criteria is called a Movement Cycle. A behavior must go through a full cycle to be counted; for example, from in-seat to out-of-seat to in-seat.

The act of defining the movement cycle is called "pin-pointing." It is important that you are very precise and specific when you pinpoint a movement cycle. The smaller and more specific a movement is, the easier it is to count. Reading pages in books is a movement cycle but not a satisfactory one. The number of words read aloud on the page is a better movement cycle because it is observable, countable, has a start and an end and is pinpointed.

The "Dead Man's Test" was developed by Dr. Lindsley to determine whether a movement cycle has been pinpointed. A dead man cannot produce a movement cycle; therefore, if a dead man could exhibit the behavior, a movement cycle has not been pinpointed. Some behaviors that do not pass the "Dead Man's Test" and are therefore not movement cycles are sitting, attending, staring and standing.

OVERVIEW OF PROCESS

1. Pinpoint
   - academic (e.g., words read correctly orally)
   - management (e.g., talking out without permission)

2. Record
   - academic (e.g., number of written or oral responses)
   - management (e.g., number of behaviors observed during set time period)

3. Chart rates on logarithmic chart

4. Change

   accelerate (e.g., want to accelerate academic correctness and appropriate management behaviors)

   decelerate (e.g., want to decelerate academic errors and inappropriate management behaviors)

5. Try, try and try again (until the desired change is achieved).

Precision Measurement is a method to assess daily how much and how fast a child is learning a specific skill. This method measures the effect of instruction and/or motivation being used with that child. Consideration of the assessment and measurement can give you some ideas about changes you may need to make that child's instruction or in how you are motivating the child. You may find that the child is learning as fast and as well as you want him to learn and you will make no changes.

Some teachers, as they start to time and chart daily rates, make the mistake of assuming that daily timings are all that is necessary for student learning. Precision Measurement is not teaching; it is a way to evaluate your teaching and your child's learning. You will continue to use those instructional materials and methods that you like to use and that are helpful to the child.

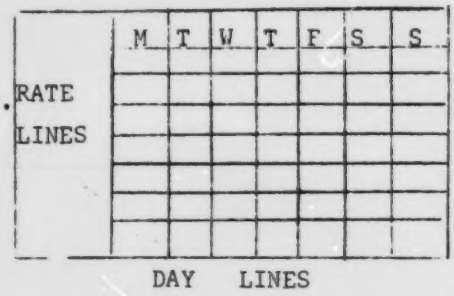
Timings and chartings should be done every day to give you and the child the information that you will use. You and the child must schedule time to look at the child's chart at least once a week. Watch the line that is developing as you fill in the chart. If the line is not moving the right way fast enough, the child may need a change in instruction, a new motivator, or different curriculum. If the line is moving the wrong way, try to determine, by yourself or with the child, what needs to be changed.

KNOW HOW TO CHART BEFORE BEGINNING A PROJECT

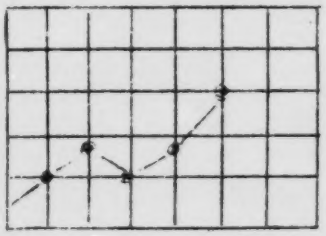
Teacher - The teacher, before beginning a Precision Measurement project with her class, must be certain that she is familiar with the parts of the chart and the various methods or conventions of charting.

It is strongly recommended that no project is begun before understanding minimum of the following terms.

1.	LOGARITHMIC CHART	Device that magnifies the distance between the units of the lower end of the scale.	Provides the teacher and the student with a visual representation of the rate of improvement.
2.	MOVEMENT CYCLE	A behavior which is observable, repeatable, ratable and has a beginning and an end.	Charted as the number of movement cycles per minute.
3.	RATED DAY	A day in which the movement could have occurred and was recorded.	Chart point on daily chart. Connect points with lines, skip all no chance and phase change spaces.
4.	RATE LINES	The horizontal lines on the chart.	
5.	DAY LINES	The vertical lines on the chart.	



6.	NO CHANCE DAY	A day in which the movement has no opportunity to occur.	Skip day on daily chart.
7.	IGNORED DAY	A day in which the movement could have occurred but was not received.	Draw line across day on daily chart.
8.	PHASE CHANGE DAY	The space following the last rated day of one phase and the first day of the next phase.	Draw a vertical line on the chart in the phase change space. Don't connect data points.
9.	ZERO RATE	No movement cycle recorded within the performance sample.	Chart point directly below one rate line.

10.	AIM	A daily projected rate the behavior hopes to reach.	Rate recorded on the student's Aim Sheet following each day's timing.
11.	ENTRY RATE	Minimum rate which indicates a child should reach his goal within 8-10 school days or less.	Can be computed by dividing the goal 1.5, i.e., the entry rate for a goal of 30 would be 20.
12.	MASTERY RATE	Rate a child must reach to maintain the skill.	See Page 27 for recommended mastery rates.
13.	GOAL	The correct and/or error performance rate for which the behaver is working.	Place a star (*) on the Sunday line on the chart at the performance rate goal.
14.	BEST-FIT LINES	A line drawn with a ruler that most accurately represents the trend shown by the daily pinpoints.	
15.	SLOPE	A line showing improvement either achieved or desired.	A desired slope would be a rate change of 1.5. Slopes are one of the basis for change of curriculum or contingencies.

PHASE CHANGES

Phase changes are very important. They should be clearly noted on the charts with vertical lines separating the data in each phase. They explain at a glance changes in the rate. It is helpful, too, if the teacher or child writes a few words on the chart above the data explaining what the phase was. For example, if a child changes from his consonant sounds to blends, his chart should be so labeled. This indicates that a child reached his goal and advanced in the curriculum sequence.

It is just as important that if there is a change in the method of instruction or a reward system set up that this also be noted on the chart and a phase line drawn. This will let the teacher know immediately which methods of instruction or arranged events with the child are most effective. For example, a chart might have the words, "partner study","flashcard practice", "language master practice of vocabulary words", "rate of 45 = 5 minutes in game corner", written on it telling briefly what was different about that phase.

WATCHING THE SLOPE - BEST FIT LINES

The slope is more significant to the interpreter of the chart than the actual daily rates achieved. Children who have charted only a few days quickly figure out that if their line is "going up" they are learning, if it is "staying the same" they need to see the teacher to try something new, and if their line is "going down", they need to practice. This quick self-evaluation of progress should be built into any class discussion regarding charting. Praise those with their lines going up, not those with the "fastest" rates. It is daily improvement that is the real key and motivator. It is defeating to the student with the slower rates, if the teacher singles out those with the fast rates for attention. It is knowing more today than yesterday that really counts.

Teachers who take the time to teach their students to chart are the teachers with the most successful projects. The teachers who have tried projects and done all the charting themselves have found that the children are not as interested or motivated about their learning, and also that the charting becomes so time-consuming that they become discouraged.

Before starting a project, students should know:

1. the use of the chart
2. the days of the week
3. how to find and read the rate lines
4. how to mark on the chart, and where
5. how to make phase lines
6. they should practice charting and be quite accurate before they record their own data
7. children can chart in partners or teams with a leader until each member can be counted on to chart on his own accurately.

TEACHING KIDS (AND YOU) TO CHART

By B. Tyler

(This is a suggested guideline for teaching kids to chart. The grade level or instructional environment will determine how many lessons a child should receive. Don't progress from one lesson to the next until a majority of your class is ready.) Most second grade students and above can manage their own charts after instruction. The instruction can be to the total class or to small groups of students who then will help the other students.

MATERIALS NEEDED:

Overhead projector
Transparency of a chart
Proper pen for overheads
Practice charts for kids
Sample weeks data

VOCABULARY:

Day lines	Goal
Rate lines	Phase lines
Rated day	Phase change
No chance day	Slope
Ignored day	

SUGGESTED LESSON PLAN IDEAS:

Lesson 1 -

Use overhead projector
Look at a chart
Find day lines that run up and down
Sunday lines are heavy lines
How many weeks are on the chart, count them
Rate lines go across the page
Find the rate lines for 1 - 10, 20, 30, 40, 50, etc. Keep it easy!

Lesson 2 -

We chart on intersecting points with a dot

Find Monday with a rate of 5
Put a dot where the lines cross
Do similar examples, keeping them simple. Use only examples where the rate lines are easy to find, not a rate of 23 or 36 yet

Lesson 3 -

Review concept of intersecting points, day lines, rate lines
Find rate lines for 20, 30, 40, and so on, for review
Then introduce concept of charting 15 - half way between 10 and 20, 28 charted close to 30
Show several examples on overhead, letting students locate rate and days
Then let kids chart in teams on a chart - 2 weeks of sample data

Let them correct their own from a sample on the overhead projector.
Introduce idea and practice connecting dots during week (no chance day and ignored days).

Lesson 4 -

Review day lines, rate lines, and intersecting points.
In teams, chart 3 weeks of sample data. Notice and praise teams who can get it right.
Self-correction from the sample on the overhead. Have easy and hard examples.

Lesson 5 -

Review intersecting points, and charting between rated lines of 10's.
Let each child have his own chart and warm up by charting one week's data. Correct by comparing with their neighbor's chart.
Do a one-minute timing seeing how many movements they can chart in a minute.

Lesson 6 -

Review as necessary.
Start a Charting Club:
Do a one-minute timing, seeing how many points they can accurately chart (Corrected by a partner). Those students who can chart 7-10 movements in a minute can join. Try to get all students in the club as soon as possible!
How about a "Charting Party" as soon as everyone has joined.

Lesson 7 -

Introduce idea of * on Sunday line for goal.
Let students practice placing *'s on appropriate rate lines for goal of 20,35,40, etc..
Introduce idea of reaching goal 2 days.

Lesson 8 -

Introduce the idea of phase lines for phase changes.
Show them how phase lines are big and dark between the day lines.
Stress the importance making them every time a goal is reached for two days, the curriculum changes, or an individual contingency is worked out.
Let them practice on a chart with sample data.
Correct by comparing with neighbor's chart.

Lesson 9 -

Review how to make phase lines and placing * for goal.
Show examples on overhead of writing a description of phases right on the chart above the data, i.e., X2, blends, pgs. 104-107, saying nice but true things, etc..

Lesson 10 - (Reverse for deceleration projects)

Introduce idea of best fit lines.
Show several examples.
Discuss idea of slope.
What does a line going up mean?
What does a line going across or staying the same mean?
What does a line going down show us?
Let them practice making the best fit lines and finding slopes on their own charts for each phase they've gone through.
A great time for class discussion.

USE OF THE AIM SHEET

The Aim Sheet can be used for many different curriculum areas. It provides both teacher and child with an accurate record of correct and incorrect responses. The space on the Aim Sheet is used for a quick analysis of the child's problem areas and to give the child a part in the decisions about his own learning.

Children can become quite sophisticated at setting daily aims for their achievement. At the end of the day's timing, each child should note on his chart the total correct and incorrect movements. He then can fill in the space with what he will need to study. Then, he projects what rate he will probably perform at the end of the next day. A child can set his own pace and look at his daily progress in a different way than on the chart alone. This Aim Sheet can be used with students from first grade through high school. The attached samples are for reading, and math Precision Measurement projects.

THE STUDENT CHARTS AND FOLDERS

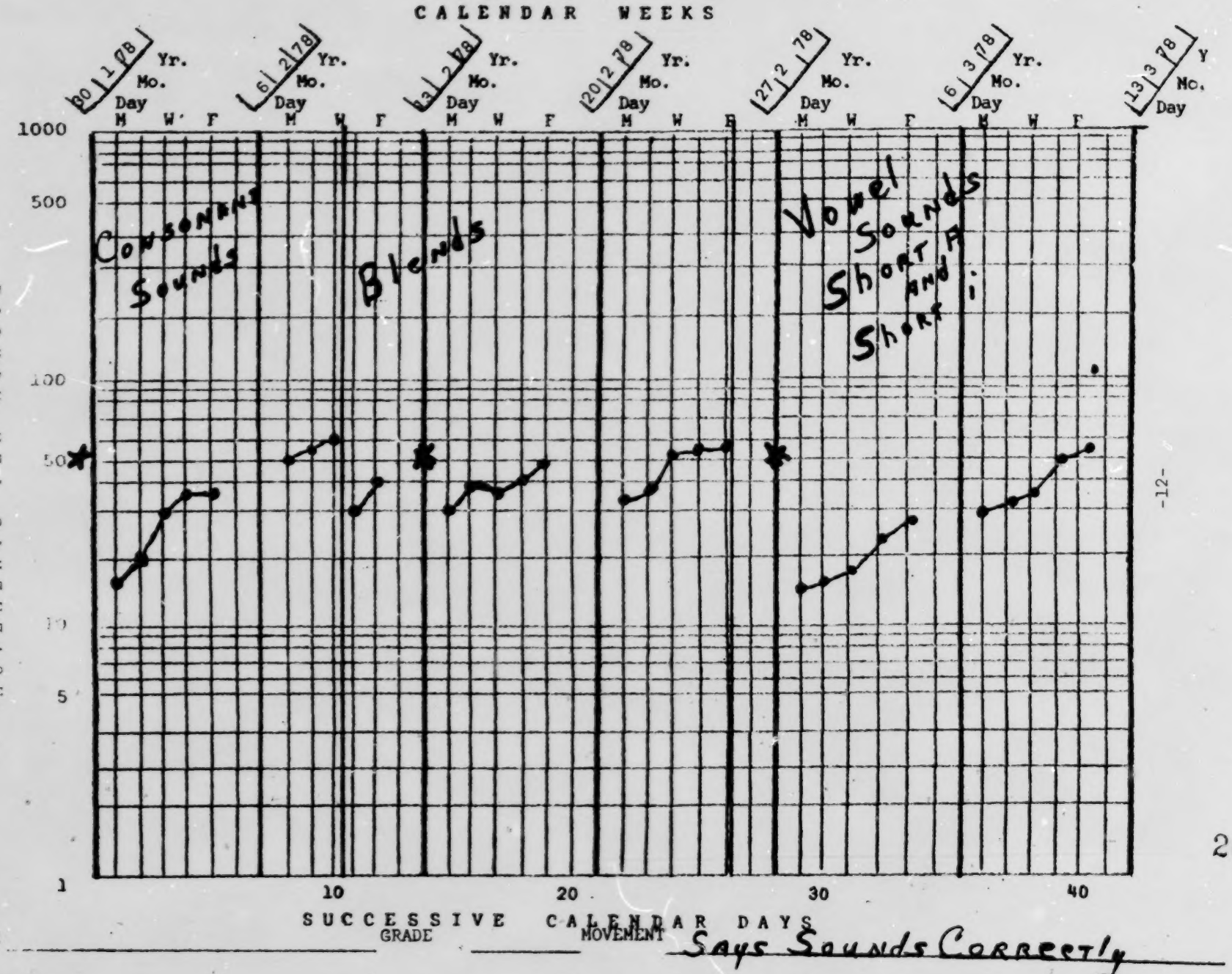
It is a good idea to keep the student charts in a folder, in a binder or on a clipboard that is readily available to both student and teacher.

A very functional method of keeping the student's chart is to take a legal-sized file folder. Fold up the bottom edge of the folder about an inch and staple the outer edges. The child's chart then can set in the pocket on one side, and their daily papers can be stored on the other side with the aim sheet. Another idea used is to put the charts in construction paper folders. This works satisfactorily as long as there is a pocket to hold the aim sheet and daily sheets, too. If not, they slide out and get lost or mixed up. Any method is fine as long as the chart is protected from loss and damage, yet is easily accessible.

For timings requiring oral responses, some teachers have set up an interest center, i.e. Progress Center, in one corner of the classroom. Materials needed for the various oral timings can be stored here and it's a recognizable place for the students to go.

IDEAS FOR STORAGE IN THE CLASSROOM OF PRECISION TEACHING MATERIALS

Some teachers have used ice cream cartons covered with contact paper and labeled for the different level sheets, i.e., +1, +2, +3, etc. Other teachers have arranged a shelf with different stacks of papers for the different levels, clearly labeling each stack. Some teachers put the different level sheets in different file folders in one box. This method is harder to use because the children have to come to a confined area. It takes longer to find the right folder in one box than it takes to select a sheet from a clearly identified stack. Color-coding is another method teachers have used so that the children can quickly identify the sheet that they are to take. Whatever method is used, the whole idea should be fast "pick up" of the papers. It should be an area to which the flow of traffic can move smoothly in and out. Teachers who have tried to call out the names of the various sheets and have children come up and get them have been very dissatisfied. It takes too long and the children become restless. It is far more desirable to have the children pick up their own sheet. This can be done in one or two minutes even with a class of 30 students, if it is planned carefully and labeled clearly.



BEHAVER _____ GRADE _____ MOVEMENT Says Sounds Correctly

NAME CHILD'S NAME MOVEMENT SOUNDS SAID CORRECTLY

	Monday		Tuesday		Wednesday		Thursday		Friday	
	Phase: CONSONANTS		GOAL 50 per minute							
1/31 (Date)	+ 18 - 3 Aim:	I need to study: t, p, b	+ 21 - 2 Aim: 25	p,d	+ 30 - 1 Aim: 35	Practice Flashcards Words With p, d, b	+ 33 - 0 Aim: 35		+ 32 - 0 Aim: 35	
	Phase:									
2/7 (Date)	+ 52 - 1 Aim: 35	I need to study: Partner Practice Before Timing Goal 40	+ 56 - 0 Aim: 50	Partner Practice	+ 61 - 1 Aim:	Reached Goal 3 Days Phase Change	+ 33 - 4 Aim:	str spr br ch	+ 38 - 1 Aim: 35	pr
	Phase:									
2/14 (Date)	+ 35 - 2 Aim: 40	I need to study: br spr	+ 38 - 0 Aim: 40	Flashcard Practice br	+ 36 - 1 Aim: 40	Partner Practice Before Timing br	+ 41 - 2 Aim: 45	Goal of 40 for 3 Days br spr	+ 44 - 1 Aim: 45	Goal of 40
	Phase:									
2/21 (Date)	+ 33 - 2 Aim: 40	I need to study:	+ 38 - 1 Aim: 40	Partner Practice	+ 53 - 0 Aim: 45	Partner Practice	+ 55 - 0 Aim: 45	* GREAT	: 55 - 0 Aim:	Goal of 50 3 Days Phase Change
	Phase: VOWEL SOUNDS --		SHORT A AND SHORT I							
2/28 (Date)	+ 15 - 3 Aim:	I need to study: U I	+ 16 - 3 Aim: 20	Practice with Short Vowel Tape i	+ 18 - 2 Aim: 20	Practice with A Partner	+ 25 - 1 Aim: 20	Continue Practice Language Master Card Short A	+ 28 - 0 Aim: 30	Continue Practice
	Phase:									
3/7 (Date)	+ 30 - 0 Aim:	I need to study: Language Master Cards	+ 32 - 0 Aim:		+ 35 - 0 Aim:	MADE AIM HOORAY!	+ 50 - 0 Aim:	GOAL OF 50	+ 55 - 0 Aim:	GREAT JOB

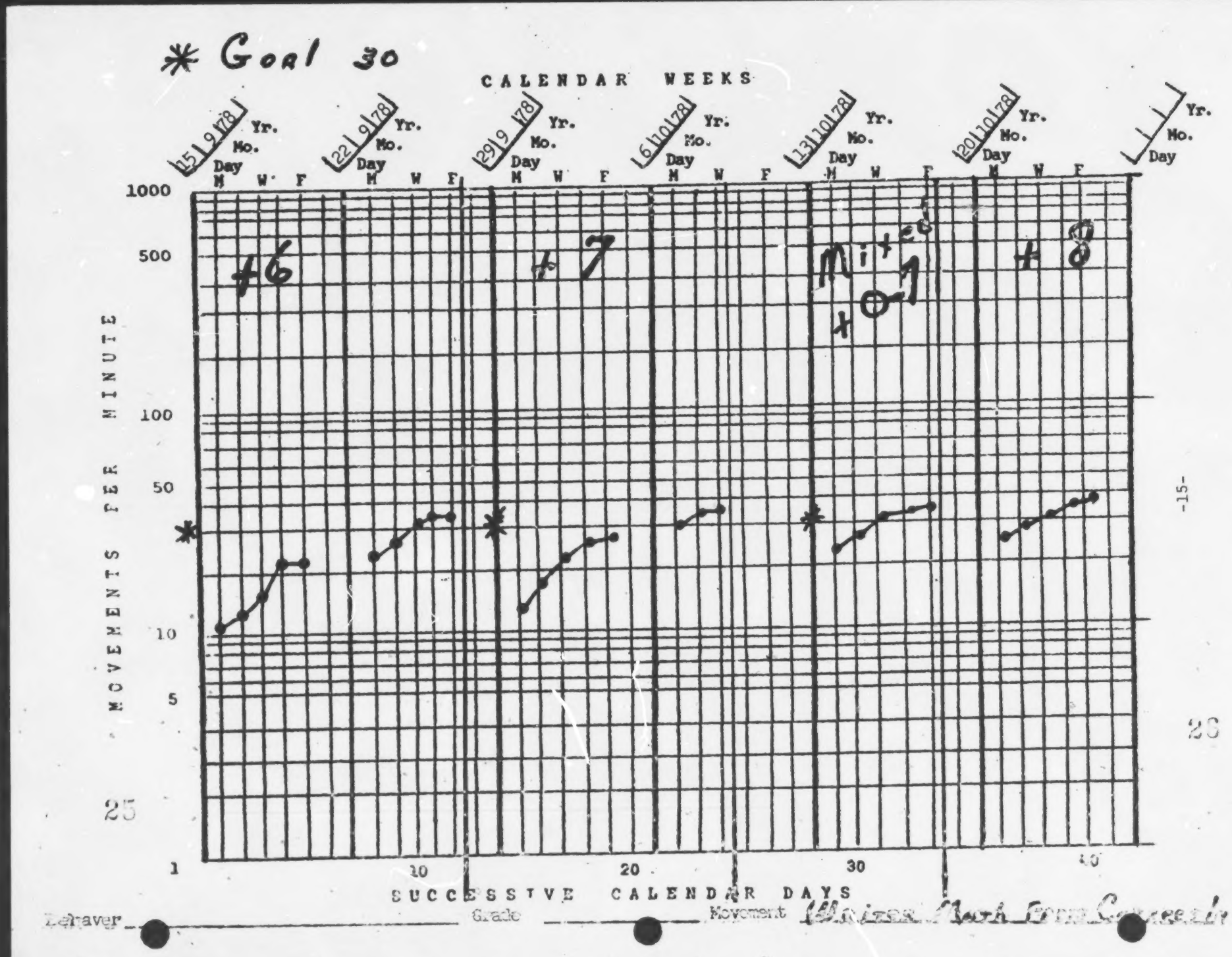
21

NAME CHILD'S NAME MOVEMENT MATH FACTS CORRECT

	Monday	Tuesday	Wednesday	Thursday	Friday
9/15 (Date)	Phase: + 6 + 11 - 1 Aim: I need to study: 6 + 8 = 14	+ 13 - 0 Aim: 15	+ 16 - 1 Aim: 20 6 + 7 = 13	+ 22 - 1 Aim: 25 6 + 5 = 11	+ 21 - 2 Aim: 25 7 + 6 = 13 6 + 3 = 9
9/22 (Date)	Phase: + 23 - 0 Aim: 25 I need to study:	+ 27 - 0 Aim: 30 Goal Of 30	+ 31 - 0 Aim: 30 REACHED GOAL *	+ 32 - 0 Aim: 30 REACHED GOAL	+ 32 - 0 Aim: REACHED GOAL 3 Days Phase Change
9/29 (Date)	Phase: + 7 + 13 - 2 Aim: I need to study: 7 + 9 = 16 7 + 8 = 15	+ 18 - 1 Aim: 20 7 + 4 = 11	+ 23 - 0 Aim: 25	+ 27 - 2 Aim: 30 7 + 3 = 10 7 + 6 = 13	+ 27 - 0 Aim: 30 Goal Of 30
10/6 (Date)	Phase: + 30 - 0 Aim: 30 I need to study: REACHED GOAL *	+ 34 - 0 Aim: 30 REACHED GOAL *	+ 32 - 0 Aim: 30 REACHED GOAL * Phase change	+ - Aim: Ignored Day	+ - Aim: Ignored Day
10/13 (Date)	Phase: MIXED 0 - 7 + 25 - 2 Aim: 30 I need to study: 9 + 8 = 17 8 + 7 = 15	+ 27 - 0 Aim: 30 Goal Of 30	+ 30 - 0 Aim: 30 REACHED GOAL of 30 *	+ 32 - 0 Aim: 30 *	+ 35 - 0 Aim: * Phase Change
10/20 (Date) 25	Phase: + 8 + 26 - 2 Aim: 30 I need to study: 8 + 9 = 17 9 + 8 = 17	+ 29 - 1 Aim: 30 8 + 9 = 17 Practice On Language Master	+ 30 - 0 Aim: 30 REACHED GOAL *	+ 35 - 0 Aim: 30 REACHED GOAL * *	+ 36 - 0 Aim: 30 REACHED GOAL Phase Change

-14-

24


* Goal 30
CALENDAR WEEKS
15 9 78 Yr. Mo. Day
22 9 78 Yr. Mo. Day
29 9 78 Yr. Mo. Day
6 10 78 Yr. Mo. Day
13 10 78 Yr. Mo. Day
20 10 78 Yr. Mo. Day
Yr. Mo. Day
M W F
1000
500
100
50
10
5
1
MOVEMENTS PER MINUTE
+6
+7
Mistake
+0-1
+8
10
20
30
SUCCESSIVE CALENDAR DAYS
Behavior
Grade
Movement
Writing Math Equations

A GENERAL PROCEDURE TO FOLLOW WITH WRITTEN DAILY TIMINGS

Many teachers beginning a Precision Teaching project benefit by observing a classroom where it's been in use for a month or more. If this is not available, the following may help. It is only a general guideline and should be adapted to the needs of the class charting.

It should be noted, however, that teachers have found that it takes about three weeks to get a "smooth" procedure that the children can follow. Don't be discouraged if at first there is some confusion. Also, it is very important to have already taught your students "how to" chart and make certain they are proficient at it before starting any project. As a rule of thumb, any procedure should not take longer than 5-7 minutes time from passing out the paper, correcting and recording their score, and returning the folder to its place.

1. A child does the same sheet each day for his timing until his goal is reached. He He can be directed to begin at different parts of the sheet each day to avoid memorizing the answers. Then he proceeds to the next sheet in the curriculum sequence.

2. Have the fact sheets and correction sheet readily available for the students before the timing starts. (See Ideas for storage of materials, previous page, 11)

3. Monitors pass out student folders containing Precision Teaching chart, Aim Sheet, and sheet for the timing. Students may also get their own folders if the timing follows a different activity, i.e., recess.

4. Children take out task sheet from the folder, place it face down on their desk. Different children are on different sheets - depending on which phase they are working.

5. Teacher says, "Ready, begin." A stopwatch or the click of the clock can be used.

6. At the end of the time period, teacher says, "Stop, pencils up". Children stop writing and lift their pencils in the air.

7. Then teacher says, "Put a box around the last item you did."

8. Arrangements can be made for self-correction of worksheet or group correction, or exchange of papers.

9. After correction student then counts the total correct responses and marks it on his chart.

10. Student then fills out the Aim Sheet with the correct responses and errors. He can also fill in the section regarding the problems he wants to study. He then sets his aim for tomorrow's rate.

11. Students may complete the rest of the timing sheet for extra practice and may correct all problems missed. This procedure depends on the student ability to learn from this process.

12. After correcting his timing, the student knows if he has reached his goal or whether he will be on the same sheet the next day. He goes to the designated area, picks up the sheet for tomorrow's timing, places it in his folder, and returns his folder to designated area. (See Ideas for Storage , Page 11).

Clear directions should be given so that the students know what to do at each step. They will finish at different times, and it will avoid some confusion if they know beforehand what to do when they finish their timings, correcting and charting. The teacher might have them begin their daily math assignments with practicing with a partner the basic facts, or any other appropriate classroom assignment.

ANSWER SHEETS

A satisfactory system has been to make 5-15 answer sheets for each curriculum level, depending on how many children are working on that level. These can be mounted on construction paper so that they are more permanent. It is helpful to color-code them for easy recognition of the various levels.

It is suggested that they be taught to circle the correct answers thereby emphasizing the correct vs. the incorrect. The usual system of marking with a checkmark the ones wrong, emphasizes the errors. The children then count up the total number of correct responses made. It should be noted here that if an answer takes more than one numeral or response it should be given credit for that many movements. For example, the answer 6 would be one movement correct, whereas the answer 12 should receive two movements correct. The children can be easily taught how to count up the number of total responses correct, giving credit to each numeral written.

After counting up the number of movements correct, the child should then chart his own score.

PROCEDURES FOR ORAL TIMINGS

If the precision measurement being used requires an oral response, the teacher needs to arrange the lessons so that the other students can be doing quiet seat work activities, or they could be working in partners preparing for their own timings. They also might have word list practice or quiet partner games. The teacher or recorder , listens to each student on a one-to-one basis for one minute. The teacher, recorder or student charts the number right. They may then discuss the slope of progress, and lessons or practice that may help the rate. Always stress the improvement made!

Another project might be setting up partner reading. Students are paired off and usually they are reading the same materials. The teacher or another student keeps track of the time and tells the students when to begin reading. The first student reads while the second student listens. The second student keeps track of the first student's errors by making light pencil marks in his book. After the time is up, the students figure the rate read correctly. The process is reversed and the second student reads to the first. Partner timings result in double attending to tasks, and both students really benefit.

The teacher's role becomes one of interpreting the slope of the chart. He must keep the curriculum challenging for the students. Also, the teacher should look for any patterns in the errors the students might be making and plan lessons accordingly.

This method of reading can replace the old method of having Students in a circle and wait for everyone else to read. The benefits are that the students are working on their own while the teacher is listening to another student. Also, the student only has to deal with his own errors and not wait while another student is given help. It also allows students to be on different places in their reading. They are rewarded for their own attending behavior when they are reading. They also know if they read more today than yesterday. The approach is much more individualized.

PRECISION MEASUREMENT AND CURRICULUM

It is important to have the Precision Measurement project reflect the curriculum you are using with your child. The timing of a completely unrelated work list to a child's reading program would not be effective or appropriate.

The sequence of the curriculum is important. You must plan the curriculum in "little steps" that lead from one phase to another with some overlap. The progression must not be in steps that are too large or that make big jumps. The sequence must flow according to some logic and not jump around. It is important that the steps not be too small, also. There must be some thread or overlapping joining the previous phase with the one being used now and the one coming up. A curriculum that is properly sequenced will have some overlapping of concepts or skills from one phase to another, and the facts or ideas will increase in difficulty one step at a time. If these criteria are met, the child should not make drastic drops in rates from one phase to the next.

Most curriculum can be set up in a format for eliciting responses from the student which can be measured with a time component. Curriculum sheets for measurement against time are convenient, easily constructed, inexpensive and adaptable to any curriculum being used. These curriculum sheets are easier to use if they are set up with a running tally of responses or in groups of ten on a page, and usually with more responses on the page than the student could make during the timing. In some instances, the sheet can be shorter with the student going through more than once in the minute. The movement cycle will be in behavioral terms and reflect the learning modality to be used; i. e., SAY WORDS, SAY LETTERS, SAY SOUNDS: WRITE NUMBERS, WRITE LETTERS, MARK SETS WITH NUMBERS OR WORDS, etc.

Suggested precision measurement projects in various instructional areas follow, with some samples of possible formats; others will suggest themselves to both teachers and students to meet individual needs.

LANGUAGE ARTS

1. Reading

   A. Alphabet names: say letter name; (See Appendix A)
      1. Manuscript - upper and lower case;
      2. Cursive - upper and lower case;
      3. Alphabetical Order;
      4. Randomly;
      5. Partial sets.

B. Sound/symbol Sheets: See Appendix B (Introductory), and C (Individual)
   1. Decide on sequence to be used - correspond to reading series being used;
   2. Consonant - single;
   3. Consonant blends and/or digraphs;
   4. Vowels (vowel digraphs blends);
   5. Partial sets;
   6. Graphemes - word families - phonograms.

C. Word Lists:
   1. Basic Sight Word List; See Appendix D
   2. Phonetic Word Lists -
      a. Consonant-vowel-consonant (C-V-C);
      b. Consonant-consonant-vowel-consonant (C-C-V-C);
      c. Consonant-vowel-consonant-consonant (C-V-C-C);
   3. Vocabulary lists from readers;
   4. Phrase lists;
   5. Essential vocabulary lists - Survival Word List; See Appendices DD-a,b
   6. Sentences from readers, etc.

D. Context:
   1. Orally;
   2. Silently;
   3. Context - Cloze techniques, with sentences, paragraphs; See Appendix E
   4. Discrimination;
   5. Sentence comprehension. See Appendices F, G, H

E. Vocabulary Enrichment:
   1. Classifying;
   2. Idea timings;
   3. Synonyms;
   4. Antonyms;
   5. Prefixes; See Appendix I
   6. Suffixes; " I
   7. Definitions;
   8. Opposites.

F. Pre-reading:
   1. Colors; See Appendices T, TT
   2. Shapes;
   3. Cutting -
      a. Straight lines;
      b. Curved lines;
   4. Rhyming

II. Language

A. Handwriting:
   1. Trace letters; See Appendix V
   2. Manuscript - upper and lower case;
   3. Cursive - upper and lower case;
   4. Copying -
      a. From paper;
      b. From board.

B. Spelling:
   1. Word sheets;
   2. Lists from speller;
   3. Alphabetizing.

C. Mechanics:
   1. Capitalization;
   2. Abbreviations;
   3. Punctuation;
   4. Contractions.

III. Mathematics

A. Number Sheets:
   1. Say numbers;
   2. Trace numbers; See Appendix W
   3. Write numbers;
   4. Read number names. See Appendix J

B. Concepts:
   1. One-to-one correspondence; See Appendix K
   2. Mark sets; See Appendices L and M
   3. Counting -
      a. One's; See Appendix N
      b. Counting patterns: two's, five's, ten's;
   4. Equations;
   5. Missing addends;
   6. Symbols.

C. Computations:
   1. Addition
   2. Subtraction
   3. Multiplication
   4. Division
   5. Fractions

The math skills you are teaching a child can be considered in Precision Measurement terms. Mathematics lends itself to this method because so many of the math and operations are observable, countable, and have a start and a stop. Math also is a sequential curriculum; there are learnings that must take place before you can go on to other skills.

The following presentation is a curriculum sequence that has been developed by teachers in Castro Valley. For over seven years, this sequence has been used by teachers in special education and in general education classes with their children. You may be aware of other curriculum sequences, and, if you like another one, adapt it to Precision Measurement and use it. The Castro Valley sequence cannot meet all needs for all children and has changed and will continue to change. The authors present this particular sequence to guide you as you start Precision Measurement.

ADDITION - The needs of the class will determine the beginning or "easiest" sheet that is needed. (it might be a sheet for a child where he looks at a grouping of objects and writes the appropriate numeral in the space by the grouping.) Or a child might be having trouble writing his numbers. His project might be writing progressive numbers 1, 2, 3, 4, and so on, in a one-minute time sample. Other children that are ready for their addition facts and understand the concept should begin with sheets on the addition facts. The facts sheets in addition would begin with a sheet on which numbers are added to one, and proceeding sheets where numbers are added to two, three, four, five, six, seven, eight, and nine---ten,if desired. Another charting project, after learning the basic facts, might be a sheet with problems having two numbers on top and two below, i.e., 43
+12

Then a following project would be adding columns with no carrying, i.e., 4
2
+2

The subsequent project would be adding with carrying in the ones column, i.e., 37
+ 45

Then a sheet with carrying in the ones column and sums above nine in the tens column would follow, i. e., 76
+ 88

Subsequent projects might follow dealing with problems of three numbers plus three numbers, i.e., 134 and 348 also a project in column addition may be helpful,
+ 724 + 532

30
i.e., 26 It is important, though, not to mix processes before each separate process
+ 39

is understood. This is where the classroom instruction must precede the charting.

SUBTRACTION - The fact sheets in subtraction would begin with a sheet on which numbers have one taken away from them, and proceeding sheets where numbers have two, three, four, five, six, seven, eight, and nine taken away from them. A following project could be a subtraction sheet of two numbers taken away from two numbers with no borrowing, i.e, 42 . A mixed sheet of borrowing and no borrowing problems would
- 36
follow.

A similar format could be used for the subtraction sheets.

MULTIPLICATION - The fact sheets in multiplication would begin with a sheet on which numbers are multiplied by one, and proceeding sheets where numbers are multiplied by two, three, four, five, six, seven, eight, and nine. The tens, elevens, and twelves may also be charted if the teacher deems it desirable. The subsequent sheets which might follow after learning the basic facts would be fact sheets of problems which students could multiply two numbers by one number, i.e., 23 , or problems
x 3

with carrying like 26 . Then could come sheets multiplying two numbers by two
x 7

numbers i.e., 46 x 24 , and then sheets with three numbers times two numbers, i.e., 274 x 32.

Projects with this much intricacy in computing each answer get a little more complicated to chart. Students should be given credit for each movement it takes to compute the answer or else he may become discouraged with a rate of completing only four or five problems in a minute, and perhaps a movement cycle of 12 or 15. It is up to the teacher as to how the child should be given credit for these problems. One system might be to grant a given number of movements for each problem completed. For example, a problem like 156 x 23 might earn five or more movements for completing correctly,

since there are several steps that need to be taken for computing the answer. These amounts can vary, and the teacher should decide this in relation to the grade level of her students, the motivational level of the students, and the method with which the child is computing the answer.

DIVISION - The fact sheets in division would begin with a sheet on which numbers are divided by one, and proceeding sheets where numbers are divided by two, three, four, five, six, seven, eight, and nine. The tens, elevens and twelves may also be charted if the teacher deems it desirable. Projects can then proceed with the various stages of learning long division, such as 3/156 , then three numbers divided by two numbers, i.e., 24/264 , and then if desired, to projects of dividing with remainders.

Projects with this much intricacy in computing each answer get a little more complicated to chart. Students should be given credit for each movement it takes to compute the answer or else he may become discouraged with a rate of completing only four or five problems in a minute, and perhaps a movement cycle rate of 12 or 15. It is up to the teacher as to how the child should be given credit for these problems. One system might be to grant a given number of points for each problem completed. For example a problem like 3/156 or 4/153 might earn five or more movements each for completing correctly, since there are several steps that need to be taken for computing the answer. These amounts can vary, and the teacher should decide this in relation to the grade level of her students, the motivational level of the students, and the method with which the child is computing the answer.

OTHER MATH PROJECTS - Other math projects can be set up as they are needed to match the curriculum being studied. The only caution is that there be gradational steps for the various task sheets. A teacher should be careful that there are not "big jumps" from one sheet to the next.

The curriculum ideas are limitless. Fractions, decimals, and percentages are easily adapted to Precision Teaching projects. The grade level and needs of each student will dictate the curriculum needed.

WHERE SHCULD EACH CHILD BEGIN

A project with math facts might progress something like this. Let's say, for example, that our project is going to be with addition facts. A good screening device would be a one-minute timing on a sheet which has addition facts with addends not to exceed five. The teacher would then need to make an evaluation of each child's sheet. Look at the rate achieved, and also the kinds of problems missed. Let's say that a break-off point might be 15-20 movements per minute, depending on the grade level.

(Subtraction 20-25, Multiplication and Division 30-40). The teacher would then look at each sheet. Let's say that John has a rate of 10 movements and his errors are problems with + 3's, +4's, and +5's. He would begin his project with a sheet of problems with addends up to plus three. Mary, however, has a rate of 6 movements, and she had difficulty with all problems above those with 1's and 2's. She should begin a project with her 2's and proceed from there. Also, since her rate is so slow, the teacher may want to begin a separate project with Mary on charting her free number writing rate to increase her speed.

Tom, on the other hand, had a rate of 22 with one or two errors. He should then go on to either another screening test with problems whose addends are from 0 through 9, or the teacher may choose to start Tom with a project on his +6's.

It is evident that there will be a broad span of projects on which students will be working. One of the real assets of Precision Measurement is this very point. In just a one-minute time sample, a teacher can collect data on how children are doing on many different levels of performance difficulties.

IDEAS FOR SETTING GOALS

There are many ways of determining a proficiency goal for children on one task sheet before they go on to another. One way is relating the goal to their free number writing rate. To find out what a child's free number writing rate is, have the students write the number 1, 2, 3, 1. 2, 3, etc., repeatedly for one minute. Do this for three days. The median of these three days rates for number writing should be a starting place for determining the child's goal. This will give you an idea of what speed of writing a child has when little or no thinking or computing is required. His goal for math facts then can be set at 1/2 of his free number writing rate.(See next page)

It should be noted, however, that this goal is just a starting point. It is best to determine goals by looking at the child's chart. Be careful to place goals within reach of the student or he will become discouraged. Also, look at the difficulty of the task to be performed, and to the motivational level of the child. Think, too, about how many phases a child can go through by letting him reach a goal and then move quickly on to a different task. A teacher can slow a child's learning by asking that he reach an unrealistic goal that cannot be obtained for several weeks time. The best solution to the question of goal setting is to look at the data. It will give the teacher the slope and rate at which the child can function. The slope will also let you know if he should be switched to easier or harder curriculum materials.

TEAM LEARNING CENTER

RECOMMENDED MASTERY RATES - WRITTEN DATA

Before a charting project is started, a student's entry rate should be established through use of a three-day trial.

The entry rate should be approximately 2/3 of the Mastery rate. If the Mastery rate is 60, the student should be able to do 40 correct responses per minute. If the student gets less than 40 per minute as a midpoint on a three-day trial, the task needs to be cut back to a simpler level.

We are aware that other people who are using timings recommend other Mastery rates, some higher and some lower. Although Precision Measurement has structure, it still requires good judgement and sensitivity on the part of the teacher. You want to keep a student on a task until he has achieved a level of Mastery so that he can perform the task in an easy, automatic fashion.

WRITTEN DATA	MASTERY RATES RECOMMENDED BY TLC		
	Grades 1 & 2	Grades 3-6	Grades 7-12
Arithmetic			
Number writing	60+	60+	60+
Computations	30	30	30
Language			
Letter writing	54-60	60+	60+

A READING CURRICULUM BREAKDOWN THAT CAN BE USED WITH PRECISION MEASUREMENT

The reading curriculum, as any curriculum adapted for Precision Measurement, must be in "little" steps so that a student can move from one phase to the next in a progression that does not "jump around" or make "big" jumps in the difficulty of materials. A curriculum which is properly sequenced, will have some overlapping of ideas from one phase to the next, and the facts or ideas will increase in difficulty one step at a time. If this is true, the students will not make drastic drops in rate from one phase change to the next.

The following is a curriculum breakdown for decoding skills that has been developed in Castro Valley. There has been little work done with regard to curriculum adapted for Precision Measurement that deals with comprehension in reading. Therefore, it is vital that anyone using this system of analyzing decoding skills realize this, and maintain the present form of lesson planning that deals with comprehension instruction and assessment.

There are curriculum sequences that have been developed for decoding in reading in other districts, by textbook companies or reading instructors. This one is not perfect, nor sacred, but might guide a teacher getting started.

LETTER SOUNDS SAID CORRECTLY

Readiness projects - The needs of the individual student will determine the beginning or "easiest" sheet that is needed. It might be a sheet where the student would identify orally the letters of the alphabet by name. Another student might need a project that matches one picture with another picture that has the same beginning sound. Whereas, some students may be ready for a project of matching pictures with appropriate letters that have the beginning sound of that picture.

Consonants - If the individual student is ready to learn his consonant sounds, then he may begin on a project using a sheet as in Appendix C. This project is done on a one-to-one basis. A teacher, parent, partner, or student aide can help with the timings for this project. For simplicity, we will refer to the collector as the teacher. The teacher listens to each student on a one-to-one basis for daily one-minute timings while the child says the sound appropriate to the consonants listed. This is a way of analyzing the students sound-symbol relationships. During the timing, the teacher follows along and records any incorrect or omitted sounds. If the error is repeated on subsequent days, she can then determine what instruction, if any, is needed to improve this phoneme/graphene relationship. Not every error needs remediation. Much instructional time is wasted by taking one day's error and planning a remediation program. If a student does not repeat the error the next day, or subsequent days, he probably knows that sound, but may have been visually inattentive.

It is our belief that a student must reach a level of proficiency with his consonant sounds before he can be successful in word attack when reading. That proficiency rate might be around 40-60 sounds per minute, depending on the age level of the student.

It should be noted that any of these sound/symbol relationship sheets can be sliced to include 4 or 5 sounds or whatever meets the students individual needs.

Consonant Blends And Digraphs - The next step in the sequence of decoding of reading is a project in sounds on Consonant Blends and Digraphs. A student has one-minute oral timings identifying the sounds made by the consonant blends and digraphs listed. His incorrect responses should be noted on the aim sheet.

The instruction accompanying this project might include flashcards or fun practicesof sounds which show up as frequent errors in his timings. At the same time that this project is being conducted, oral reading timings can be collected in the appropriate reader for the student's ability. Proficiency rates for this consonant blends project might be around 40-50 sounds per minute correct.

Vowel Sounds - The next progression in the decoding sequence would be timings dealing with the vowels, followed by a project in vowel diagraphs and diphthongs. The procedures for conducting these projects would be the same as the ones previously described. The teacher should analyze the errors that a student might make and include the necessary instruction in the program to help with the problem.

These sheets begin with just two vowel sounds on a sheet with a review interspersed of consonant sounds. It is open-ended in their use. If a teacher is only giving instruction dealing with long vowel sounds, the sheet can be used appropriately. The same is true for short vowel sounds. There are no markings over the vowels to determine the correct response. It is the teacher who directs which sound should be given by the student. Some teachers have had students look at a vowel and give both the long and short sounds it can say.

Blending Project - At the same time that a student begins the vowels projects listed above, he should begin timings using three-letter words in a blending project. We have included an example of a consonant-vowel-consonant word list from the series developed by Heggs, Kirk and Kirk, for remedial reading drills. (See Appendix B) The SRA linguistics series, or Distar could also be a source for three=letter patterns. Another source would be word lists that come from the reading series the student is using. The judgment of the teacher should be used here to determine which is best for the student considering the instructional program being carried out in the classroom. This timing project is a big one for students! The skill of blending the sounds into a word is critical for his reading proficiency! Much reinforcement and praise for improving should be given the student. Fun practice and frequent rewards should be planned.

On the Heggs, Kirk and Kirk sheet (PRACTICE) the words that are separated by a space between each letter should be used for the student to practice the blending of the sounds. We have used the top section as the actual list for the timing with the student. Subsequent sheets would follow where there are three-letter words with the "i" vowel in the middle, then "o" lists, then "u", and last "e". A proficiency rate for this project might be 40-50 words said correctly per minute, depending on the age of the student.

Word Lists - Timings with word lists can begin either during or after the blending project to help build a student's word recognition rate. Lists for this project can be taken from the back of his reader, thereby reinforcing his ability to recognize words in his assignments. Another project might be needed by some students such as word recognition timings from the Dolch Basic Word list (See Appendix D), or the First Thousand Words for Children's Reading, Garrard Press, or Survival Word List (See Appendix DD-a & b). A proficiency rate for this project might be 50-70 words said correctly in a minute.

Oral Reading - Projects in oral reading can be held subsequent to or right along with sound projects. This project is aimed at improving the students ability to have word recognition in content. With beginning and remedial readers, we do need to know their proficiency at reading words in order to predict their comprehension in their reading. Clay Starlin from the University of Oregon has done research to indicate that comprehension in reading from most children does not take place until student can read a minimum of 50 words per minute. He feels that students should be able to read at a proficiency level of 100 - 120 words per minute with two or less errors. With this goal in mind, a teacher should carefully assess the text the student is using in light of his oral reading rate. We may be building in failure if our assignments are geared to comprehension when the child is only reading 20 - 30 words per minute. One should be able to predict the "understanding" of what is being read by the rate read.

Silent Reading - With intermediate students who have demonstrated a proficiency level of 120 or above with few errors for two or three weeks in the text of their grade level or above, they could do silent reading timings where errors would not be considered, but where the student could do one-, two-, or five-minute time samples of the number of words read silently. A simpler method of counting the movements this longer time period would be to chart lines read. This system of counting is not advisable for oral words read, because the data received is too general for careful assessment.

Other Reading Projects - Other reading projects can be set up as they are needed to match the curriculum being studied. The only caution is that there be gradational steps for the various task sheets. A teacher should be careful that there are not "big jumps" from one sheet to the next.

The curriculum ideas are limitless. Silent reading, rhyming words, opposites, word associations, or vocabulary matching meanings to definitions are easily adapted to Precicion Measurement projects. The grade level and needs of each student will dictate the curriculum.

SUGGESTED PROFICIENCY RATES OR GOALS

It is difficult to say exactly what are the proficiency rates for each area of reading. We will set out some general guidelines to help teachers but it should be kept in mind that this is only a suggestion. Proficiency rates for letter sounds projects might be 50-60 per minute correctly. Proficiency rates for blending projects might be 40-50 words per minute. Oral reading rates might be 100 - 120 per minute. Irregular sight words project goals might be 50 - 70 words per minute. We cannot recommend a rate for silent reading. It should be higher than the oral reading rate, but a proficiency rate has not been established.

It should be noted, however, that this goal is just a starting point. It is best to determine goals by looking at the students chart. Be careful to place goals within reach of the student or he will become discouraged. Also, look at the difficulty of the task to be performed, and to the motivational level of the student. Think, too, about how many phases a student can go through by letting him reach a goal and then move quickly on to a different task. A teacher can slow a student's learning by asking that he reach an unrealistic goal that cannot be obtained for several weeks' time. The best solution to the question of goal setting is to look at the data. It will give the teacher the slope and rate at which the student can function. The slope will also let you know if he should be switched to easier or harder curriculum materials.

TEAM LEARNING CENTER

INDIVIDUAL RATED INVENTORY - RECOMMENDED MASTERY RATES

ARITHMETIC+	RECOMMENDED MASTERY RATES		
Number Reading	Grades 1 & 2	Grades 3 - 6	Grades 7 - 12
0-9 (free rate)	80	100	100
0-20	70	90	90
0-100	60	80	80
100-900	50	50	50
1,000-10,000	-	-	40
Oral Counting			
One's	70-80	80-100	80-100
Ten's	200+	300	300
Five's	125-150	225	225
Two's	100+	100	100
READING			
Oral Reading Timing	80	100-120	100-120
Survival Word List	-	-	60
Sight Words	50	60	60
Phonetic Words	40	50	50
Consonants	50	50-60	50-60
Consonant Blends & Digraphs	40	50	50
Vowels (short & long)	50	50	50
Vowel Digraphs & Diphthongs	40	40	40
Prefixes and Suffixes			
Alphabet Names--Manuscript-Upper	60	80	80
-Lower	60	80	80
Alphabet Names--Cursive -Upper	60	80	80
-Lower	60	80	80

CVUSD/Title VI
1/78

APPENDICES

The following pages are sample curriculum formats that have been used in precision measurement projects. They are not complete, and not in sequential order. They are included here to give samples of suggested areas for doing timings.

Many projects throughout the United States have developed complete sequential curriculum in basic skills. Information about these projects could be obtained from the Universities of Washington at Seattle, Oregon at Eugene, and Kansas at Lawrence.

The Team Learning Center has developed a math curriculum that is available for $2.50 plus postage.

Movement: Student Reads Letter Names Correctly.

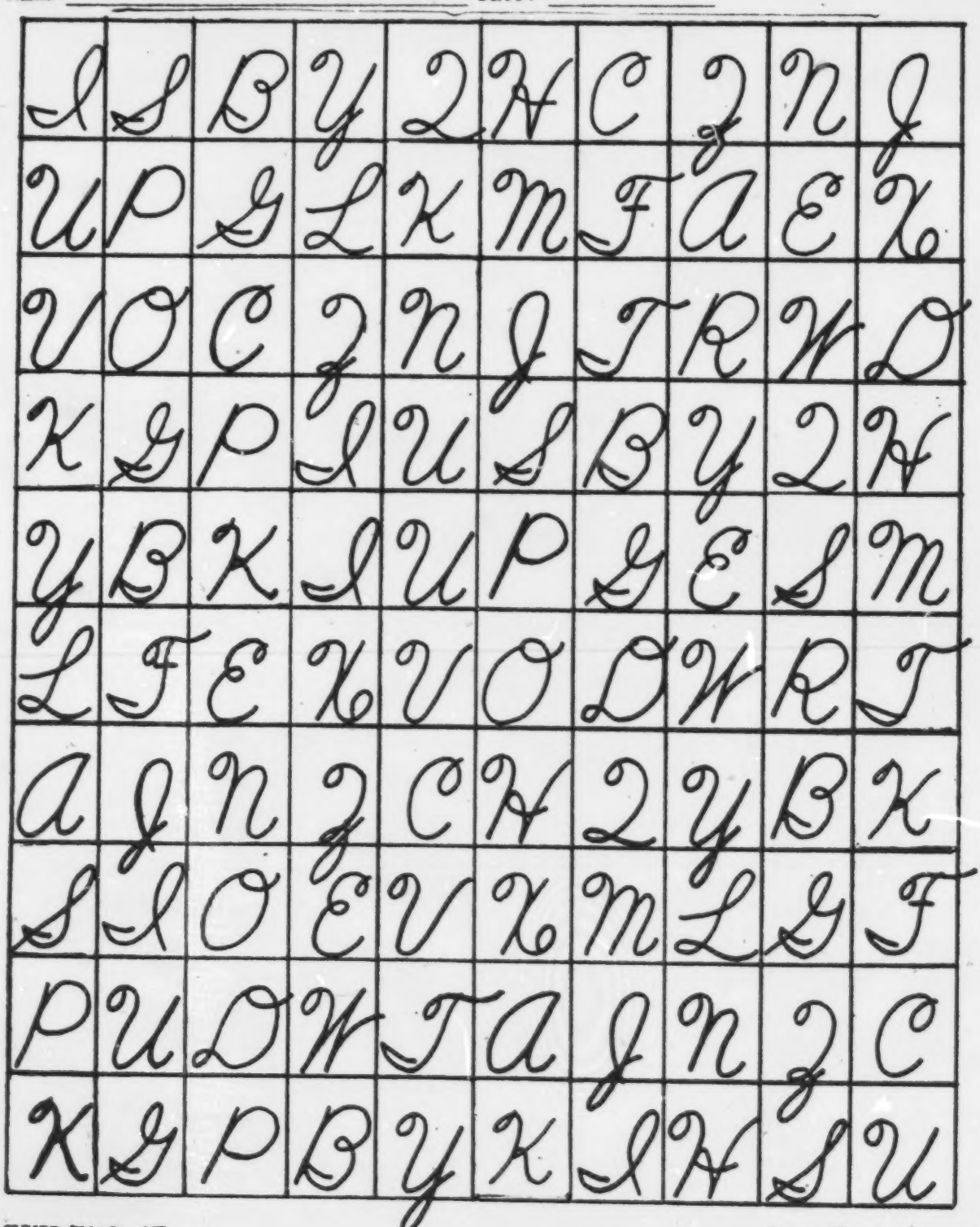
ALPHABET NAMES: Cursive - Upper Case.

Directions: Student reads orally the letter names for one minute.

Correct _____

Errors _____

Name: _____ Date: _____



Introductory Sounds.

Movement: Student Reads Words Correctly.

Correct_____

Name:_____Date_____Errors_____

sat	cap	rag	can	sad	mat	sap
ram	bag	man	mad	rat	map	Sam
tag	ran	had	bat	tap	ham	wag
tan	lad	cat	lap	dam	hag	fan
pad	fat	rap	jam	lag	pan	dad
5	10	15	20	25	30	35

Practice:

s a t	m a t	r a t	b a t	c a t	f a t
c a p	s a p	m a p	t a p	l a p	r a p
m	r a m	S a m	h a m	d a m	j a m
r a g	b a g	t a g	w a g	h a g	l a g
c a n	m a n	r a n	t a n	f a n	p a n
s a d	m a d	h a d	l a d	p a d	d a d
s a t	s a p	S a m	s a d	m a n	p a t
m a p	m a n	m a d	m a t	c a n	m a n
t a n	t a p	t a g	t a x	c a t	b a t
c a b	c a t	c a p	c a n	f a n	t a g
b a g	b a d	b a n	b a t	f a t	b a n
h a t	h a m	h a g	h a d	m a d	c a b
r a p	r a t	r a n	r a g	l a p	t a p
l a d	l a p	f a n	f a t	d a m	r a p

CVUSD/Title VI
1/78

Movement: Student says sound correctly for symbol.

Phase: Consonant Sounds

Name:_____ Date:_____ Correct:_____

Errors:_____

J	m	c	b	s	j	D	M	c	p
L	w	h	F	n	d	k	l	G	r
w	t	y	b	f	T	g	Y	R	B
K	P	v	x	p	V	z	l	s	m
c	d	j	w	h	r	n	g	b	f
y	P	t	D	m	c	L	j	n	g
D	h	f	F	v	B	R	T	g	N
y	j	w	r	s	g	b	m	c	y
k	h	B	L	t	w	z	h	x	p
c	j	v	m	f	d	n	g	r	s

Movement: Student reads words orally correctly.

Phase: Level I of Dolch Basic List

Directions: Student reads words orally for one minute.

Correct _____

Errors _____

BASIC WORD LIST 1-250 WHICH EVERY PUPIL SHOULD KNOW

I	a	dear	house	old	they
	about	did	how	on	thing
	after	didn't	I	once	things
	again	do	if	one	think
	all	dog	in	only	this
	along	don't	into	or	thought
	also	door	is	other	three
	always	down	it	our	through
	am	each	know	out	time
	an	eat	just	over	to
II	and	enough	keep	people	today
	another	ever	kind	place	told
	any	every	large	play	too
	are	farther	last	pretty	took
	around	few	left	put	town
	as	find	let	ran	tree
	asked	fire	letter	read	two
	at	first	like	ready	until
	away	five	little	right	up
	back	for	live	room	use
III	be	found	lived	said	used
	beautiful	four	long	saw	very
	because	friend	look	say	want
	bed	from	looked	see	wanted
	been	fun	made	school	was
	before	gave	make	she	water
	best	get	man	should	way
	better	getting	many	side	we
	big	girl	may	small	week
	book	girls	me	snow	well
IV	boy	give	men	so	went
	boys	go	money	some	were
	brother	going	more	something	what
	but	good	morning	soon	when
	by	got	most	started	where
	called	great	mother	stay	which
	came	had	much	still	while
	can	hard	must	summer	white
	car	has	my	sure	who
	children	happy	name	take	will
V	Christmas	Have	never	teacher	winter
	city	he	new	tell	with
	cold	heard	next	than	work
	come	help	nice	that	would
	comes	her	night	the	write
	coming	here	no	their	year
	could	him	not	these	years
	country	his	now	them	you
	day	home	of	then	your
	days	hope	off	there	

DIRECTIONS: Student reads words orally for 1 minute.

SURVIVAL VOCABULARY

I	Adults only	No admittance
	Antidote	No checks cashed
	Beware	No credit
	Bus station	No dogs allowed
	Caution	No dumping
	Closed	No fires
	Combustible	Fire permit required
	Contaminated	No loitering
	Condemned	No fishing
	Deep water (13)	No hunting (23)
II	Dentist	No minors
	Don't walk	No smoking
	Do not cross	Smoking prohibited
	Do not inhale fumes	No swimming
	Do not refreeze	Swim at your own risk
	Do not use near heat	Do not touch
	Do not use near open flame	Do not handle
	Doctor (Dr. - M.D.)	No trespassing
	Down	Not for internal use
	Dynamite (29)	Noxious (26)
III	Elevator	Nurse
	Emergency	Office
	Employees only	Open
	Entrance	Out of order
	Exit	Pedestrians
	Escalator	Stairway
	Explosives	Poison
	External use only	Post office
	Fire escape	Private
	Fire extinguisher (15)	Pull (13)
IV	First aid	Push
	Lost and found	Taxi stand
	Fragile	Cash only
	Gasoline	This end up
	Gentleman	This side up
	Ladies	Use before (date)
	Handle with care	Use other door
	Hands off	Violators will be prosecuted
	Help	Warning
	High voltage (17)	Watch your step (24)
V	Inflammable	Wet paint
	Flammable	Please print
	Information	Police
	Keep away	Parking
	Keep closed at all times	Ask attendant for key
	Keep off	Bicycle path
	Instruction	Bike route
	Live wires	Construction zone ahead
	Men	Soft shoulder
	Women (17)	Rough road (21)

SURVIVAL VOCABULARY (continued)

VI	No motorcycles Go back, wrong way No services next ___ miles Cross winds Gusty wind area Entering toll area Caution Curve Danger Toxic (22)	Pavement ends Pedestrian Xing Proceed at your own risk Railroad crossing (R.R.) Restrooms Resume speed Rest area Road closed School zone Slide area (22)
VII	Deer (cattle) crossing Free direction Detour Dead end Dim lights Dip Hill Do not block driveway Keep clear Do not enter (21)	Slippery when wet or frosty Slower traffic keep right Speed checked by radar Steep grade Stop Signal ahead Stop when occupied Stop for pedestrians Stop motor Patrolled by aircraft (29)
VIII	Drive slow Emergency vehicles only Falling rocks Exit speed _____ Flooded Freeway Four-way stop Garage Hospital zone Junction (18)	Three-way light Truck route Loading zone Watch for flagman Winding road Yield right of way Clearance ____ feet (18)
IX	Keep to the right (left) Lane ends Last chance for gas Check fuel gauge Speedometer check Left lane must turn left Left turn on this signal only Right turn only Mechanic on duty Men working (34)	
	Merge left Merging traffic No left turn No passing No right turn on red light No standing No stopping No "U" turn Not a through street One way (28)	

PRECISION MEASUREMENT AND CONTEXT

Cloze Technique

What Happened To You? NUMBER CORRECT_____

Movement: Student writes meaningful word in sentence.

The space man saw all he wanted_____see.
Then he came back to the rocket.
"_____did you stay so long?
Climb in _____ me," I said.
" I want to _____going."
So the space man sat _____by me in the
rocket. Down whizzed that _____ .
Right down to his back door!
"Here _____ are. Hop out!" said ths space _____.
At first _____ he said was "Oh!"
Then he looked at _____ and said,
"What happened to you up _____ on the moon?
Just look at yourself. _____ are 100 years old."

1 (b)

A MORNING IN SPRING

Once upon a time there _____ a farm.
This farm was far from town, _____ edge of a big woods.
So it was _____ Faraway Farm.
Faraway Farm was not like the farms you _____ so
much about. Oh, my, no!
Faraway Farm was _____. It was a pony farm.
One morning in spring _____ happened inside
the big warm barn on Faraway Farm.
_____ little colt was born to its pony mother.
The newborn _____ had long, long legs.
Its coat was brown _____ white.

Appendix E

SENTENCE COMPREHENSION

YES OR NO SENTENCES - LEVEL 1

NAME_____ NUMBER CORRECT_____

Movement: Reads sentences and correctly circles Yes or No.

1.	Do people get wet?	Yes	No
2.	Are some books green?	Yes	No
3.	Do all streets have lights?	Yes	No
4.	Is rain wet?	Yes	No
5.	Could a tree walk?	Yes	No
6.	Is morning a time?	Yes	No
7.	Could an old man eat?	Yes	No
8.	Do people know something?	Yes	No
9.	Could you find a house on a farm?	Yes	No
10.	Could you write with a book?	Yes	No
11.	Could a home walk?	Yes	No
12.	Are morning and night black?	Yes	No
13.	Could Mary walk up a tree?	Yes	No
14.	Is Mr. Black a little boy?	Yes	No
15.	Are birthdays fun?	Yes	No
16.	Are friends something to like?	Yes	No
17.	Does a birthday make people happy?	Yes	No
18.	Could you jump over a big house?	Yes	No
19.	Do you know how to laugh?	Yes	No
20.	Could rain go up?	Yes	No
21.	Could a girl have friends?	Yes	No
22.	Could morning come after night?	Yes	No
23.	Is again a word?	Yes	No
24.	Do you know how to find your house?	Yes	No
25.	Are farms something to work on?	Yes	No
26.	Can mornings laugh?	Yes	No
27.	Can friends show you that they like you?	Yes	No
28.	Can rain see things?	Yes	No
29.	Are books something to eat?	Yes	No
30.	Do people write books?	Yes	No

Vocabulary from Harper and Row - Level 1

SENTENCE COMPREHENSION

CAN YOU.....? NUMBER CORRECT_____

Student reads sentence and circles correct answer.

Movement: Reads sentences and correctly circles Yes or No.

1.	Can you wear a bench?	Yes	No
2.	Can you borrow a handkerchief?	Yes	No
3.	Can you harness a bundle?	Yes	No
4.	Can you hang up a costume?	Yes	No
5.	Can you taste a vegetable?	Yes	No
6.	Can you wiggle a road?	Yes	No
7.	Can you travel on a train?	Yes	No
8.	Can you stretch a robber?	Yes	No
9.	Can you splash water on an umbrella?	Yes	No
10.	Can you sign your name?	Yes	No
11.	Can you have a callus on your thumb?	Yes	No
12.	Can you see the landlord paint the cottage?	Yes	No
13.	Can you listen to a policeman?	Yes	No
14.	Can you sing a solemn song?	Yes	No
15.	Can you lift a goatskin full of water?	Yes	No
16.	Can you treasure a birthday gift?	Yes	No
17.	Can you tie up a tiger?	Yes	No
18.	Can you toss a mountain?	Yes	No
19.	Can you tie a shoestring?	Yes	No
20.	Can you jingle the world?	Yes	No
2k,	Can you remember to buy a magazine?	Yes	No
22.	Can you milk a stone?	Yes	No
23.	Can you wrestle a sardine?	Yes	No
24.	Can you walk in a quiet valley?	Yes	No
25.	Can you hear a tune?	Yes	No
26.	Can you fasten a cherry tree?	Yes	No
27.	Can you lead a cabin?	Yes	No
28.	Can you carry a parrot in a bird cage?	Yes	No
29.	Can you push a donkey cart?	Yes	No
30.	Can you visit a tie?	Yes	No

Vocabulary from Harper and Row - Level 3

Appendix G

PRECISION MEASUREMENT AND CONTEXT

Sentence Comprehension

Movement: Words circled correctly.

Student reads completely through the sentence, then determines the most appropriate choice of word to complete the sentence. Student then circles his choice.

1.	The first watches were called "eggs." They got this . . . . . because of their shape.	hello	window	name
2.	Birds can find food in the summer. But birds need help from people when . . . . . comes.	winter	gold	away
3.	It is fun to have a pet cat. A cat can . . . . . many tricks.	must	learn	eat
4.	No animal lives as long as a tree. Old trees are much . . . . . than any animal.	face	going	older
5.	Some cats like milk. Other cats like fish. Cats are like people. Not all of them like the . . . . . thing.	bell	high	same
6.	One animal never eats. This animal has no . . . . . ! It lives for only one day.	best	mouth	over
7.	Write the names of all the birds you see. In . . . . . one day you might have ten names.	catch	read	just
8.	Flying fish go high into the air. They do this because some other fish is . . . . . them.	after	green	little
9.	In one country letters are carried by . . . . . Elephants take the place of trucks, trains, and airplanes.	trees	animals	last
10.	Indians once put bells around their legs. They liked the sound the . . . . . made.	chickens	trains	bells
11.	Some trees can grow right inside your house! These . . . . . trees never grow more than one foot high.	small	cry	song
12.	The nest of one kind of bird looks like a little grass boat! It . . . . . on the water.	floats	this	book
13.	Trains in the early days were not always on time. They often had to stop until sleeping cows got off the	tall	tracks	blue
14,	Once a watch was made in the . . . . . of a flower. The owner thought the watch looked very pretty.	river	monkey	shape
15.	Most monkeys like to live where it is . . . . . Not many like to live where it is cold.	look	car	warm

Movement: Student reads prefix or suffix correctly.

Directions: Student reads underlined prefixes and suffixes orally for one minute. Student is allowed to refer to the key word as necessary.

PREFIXES AND SUFFIXES

ing	go ing	inter	inter national
in	in side	or	sail or
ly	slow ly	con	con text
re	re turn	ed	frost ed
less	care less	super	super man
pre	pre tend	ty	royal ty
er	help er	ance	entr ance
trans	trans port	un	un fair
est	tall est	cial	so cial
ex	ex port	per	per son
ness	happi ness	im	im prove
dis	dis like	ure	meas ure
ment	move ment	trial	par tial
com	com press	ad	ad join
tion	sta tion	cious	deli cious
co	co pilot	ism	hypnot ism
able	comfort able	ward	home ward
sub	sub way	ize	fertil ize
de	de lay	be	be fuddle
ful	beauti ful	ar	regul ar

CVUSD
Title VI
1/78

CORRECT _____

ERRORS _____

Movement: Correctly reads numbers orally.

Phase: Out of Sequence 0 - 20.

Directions: Student reads numbers orally for one minute.

Correct _____

Name: _____ Date: _____ Errors _____

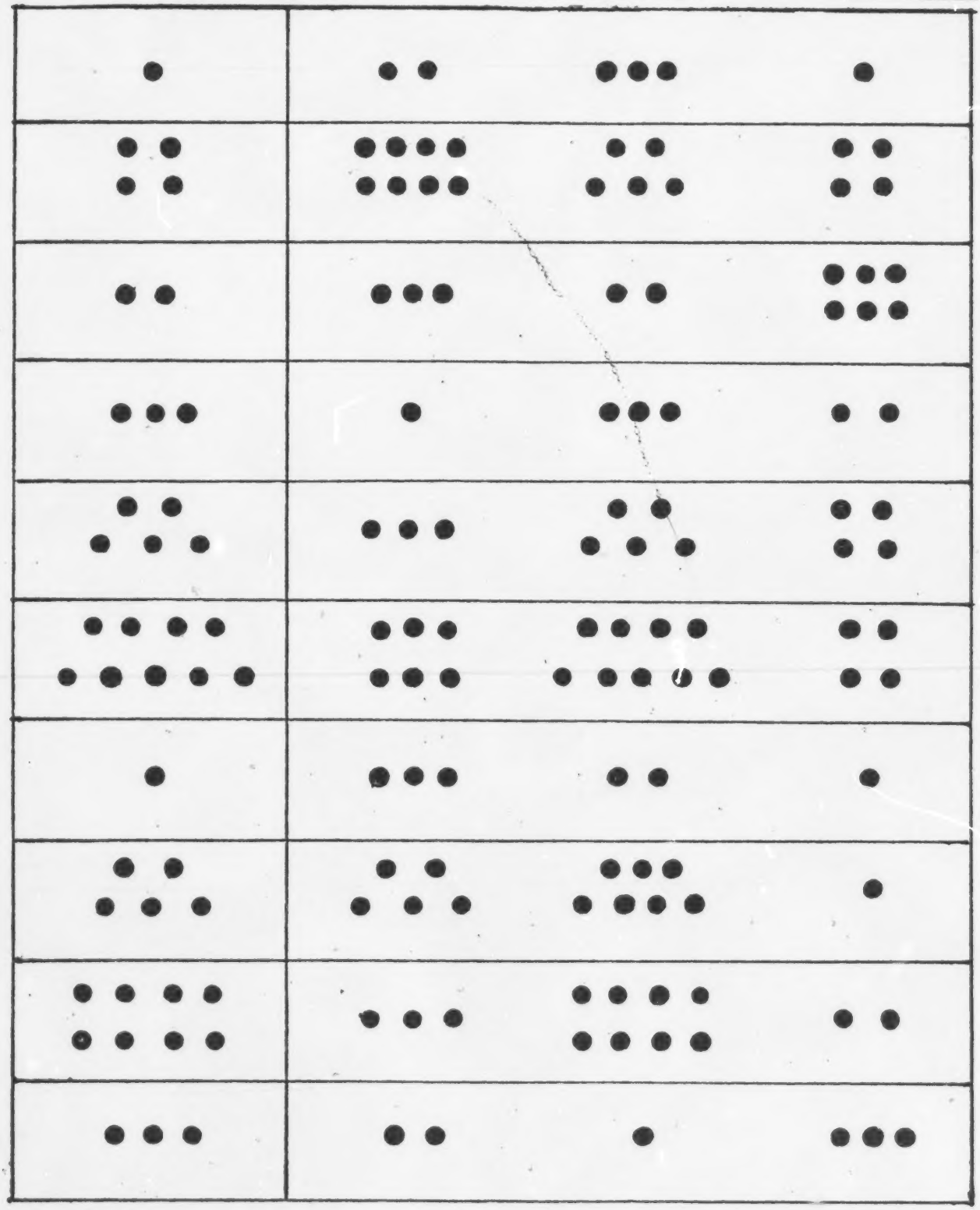
3	12	8	15	1	14	20	7	10	5
6	17	19	11	4	13	9	16	2	18
16	2	12	15	8	19	6	17	14	4
5	20	11	1	13	3	9	18	7	10
0	5	10	7	20	14	1	15	8	12
3	18	2	16	9	13	4	11	19	17
6	4	14	17	6	19	8	15	12	2
16	10	7	18	9	0	3	13	1	11
20	5	12	8	15	1	14	20	7	10
3	18	2	16	9	13	4	11	0	19

Movement: Circle Matching Sets.

Math Concepts: One-to-One Correspondence.

Correct _____

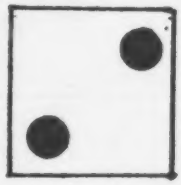
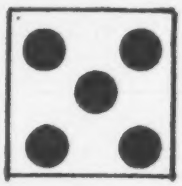
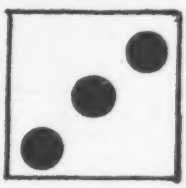
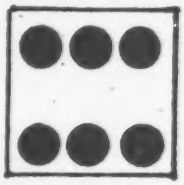
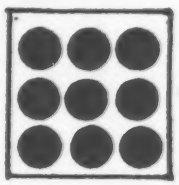
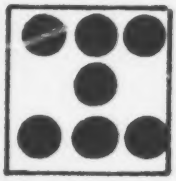
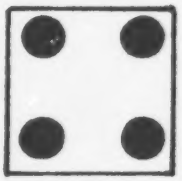
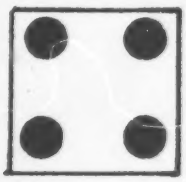
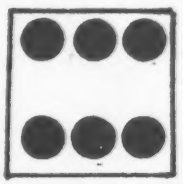
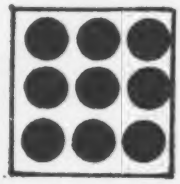
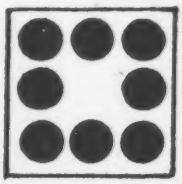
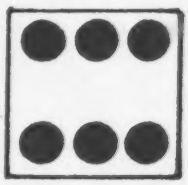
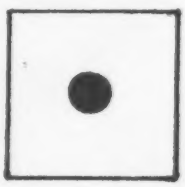
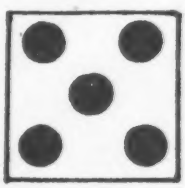
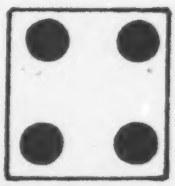
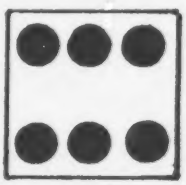
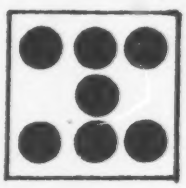
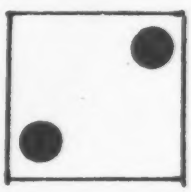
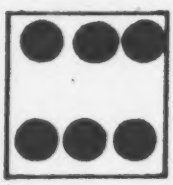
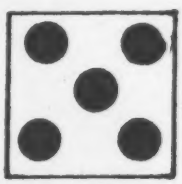
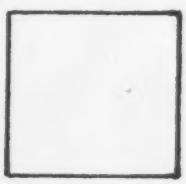
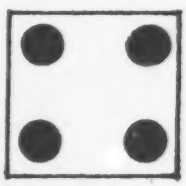
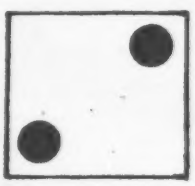
Name: _____ Date: _____ Errors _____



Movement: Circle the number that matches the dots.

Phase: Early Math - matching. Correct _____

Name: _____ Date _____ Errors _____

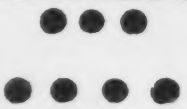
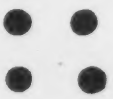
 3 2	 7 5	 5 3	 7 6	 9 7
 5 7	 4 3	1 3	 4 5	 7 6
 7 9	 8 7	 6 8	 2 1	 3 5
 5 4	1 0	 9 6	 7 5	 0 2
 3 6	 6 5	 0 5	 4 3	 2 5

Movement: Circle The Set That Matches The Number.

Phase: Early Math - Matching

Correct_____

Name:_____ Date_____ Errors_____

6			
2			
7			
5			
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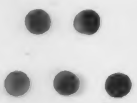
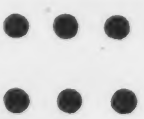
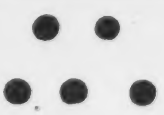
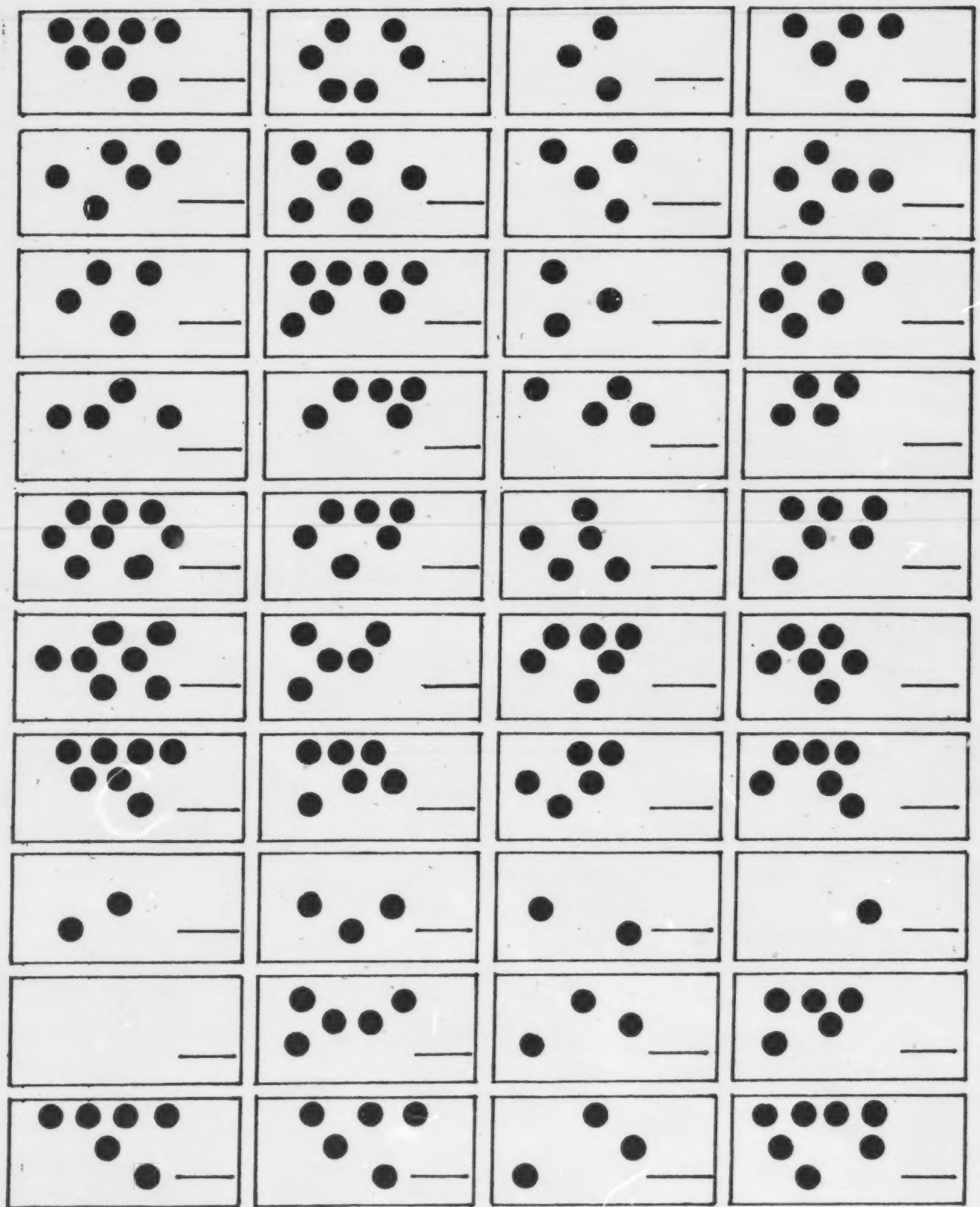
4			
6			
8			
3			
7			

MOVEMENT: Write the Number Name for each set.

Phase: Early Math - Counting Dots.

Correct_____

Name_____ Date_____ Errors_____



Movement: Writes Addition Facts Correctly.

Phase: + 3

NAME_____ DATE_____ CORRECT_____

ERRORS_____

3 + 3 =	1 + 3 =	3 + 7 =
3 + 9 =	5 + 3 =	2 + 3 =
3 + 7 =	8 + 3 =	3 = 5 =
3 + 1 =	4 + 3 =	8 + 3 =
3 + 5 =	10 + 3 =	9 + 3 =
3 + 2 =	3 + 3 =	3 + 4 =
3 + 8 =	7 + 3 =	6 + 3 =
3 + 4 =	6 + 3 =	3 + 10=
3 + 10 =	2 + 3 =	3 + 1 =
3 + 6 =	9 = 3 =	3 = 3 =

3 +6	3 +3	3 +10	3 +7	3 +9	3 +5	3 +2	3 +4
4 +3	2 +3	6 +3	7 +3	8 +3	3 +3	5 +3	1 +3
9 +3	3 +5	6 +3	3 +7	4 +3	8 +3	3 +2	10 +3

CVUSD
TITLE VI
1/78

Appendix O

Movement: Writes Addition Facts Correctly

Phase: Mixed + 0 - 10

NAME_____ DATE_____ CORRECT_____

ERRORS_____

10 + 7 =	8 + 7 =	6 + 7 =
4 + 9 =	10 + 3 =	2 + 1 =
6 + 3 =	7 + 9 =	9 + 2 =
1 + 4 =	2 + 4 =	8 + 10 =
0 + 10=	6 + 5 =	3 + 4 =
5 + 5 =	1 + 1 =	7 + 8 =
9 + 6 =	0 + 8 =	5 + 3 =
3 + 4 =	3 + 1 =	0 + 5 =
2 + 2 =	9 + 6 =	4 + 9 =
7 + 9 =	5 + 2 =	1 + 6 =

10 +4	2 +3	7 +7	4 +1	5 +2	7 +6	3 +3	0 +8
9 +5	4 +4	6 +2	2 +7	9 +1	2 +2	4 +6	5 +10
8 +5	5 +3	5 +2	9 +9	8 +7	1 +3	9 +5	10 +9

Movement: Writes Subtraction Facts Correctly.

Phase: 2 Place Borrowing.

Name:_____ DATE:_____ Correct:_____

Errors:_____

46 -18	68 -49	61 -37	63 -16	92 -14	39 -19
44 -28	92 -49	61 -22	73 -18	75 -27	88 -79
82 -36	81 -24	35 -16	71 -48	74 -36	77 -68
62 -17	95 -69	56 -39	93 -34	91 -53	66 -59
84 -55	51 -25	92 -78	84 -18	43 -19	55 -47
81 -22	75 -49	93 -55	94 -17	82 -67	44 -19
43 -24	57 -18	68 -29	37 -19	52 -28	87 -38
41 -16	52 -52	63 -38	74 -49	85 -56	96 -47

CVUSD
Title VI
1/78

Appendix P

Movement: Writes Subtraction Facts Correctly.

Phase: 3-Place, No Borrowing.

Name:_____ Date:_____ Correct_____

Errors_____

437 -310	685 -250	797 -605	987 -606	749 -105
369 - 59	476 - 74	768 - 66	598 - 28	272 - 72
239 -236	457 -455	379 -373	928 -927	168 -163
750 -240	808 -204	990 -740	803 -303	506 -303
692 -662	89 - 87	381 -331	958 -952	347 -344
800 -400	900 -600	500 -300	700 -300	800 -500
520 - 20	940 - 40	760 - 60	480 - 80	850 - 50

CVUSD
Title VI
1/78

Appendix PP

Movement: Writes Multiplication Facts Correctly

Phase: X 3

NAME_____ DATE_____ CORRECT_____

ERRORS_____

3 x 3 =	1 x 3 =	3 x 7 =
3 x 9 =	5 x 3 =	2 x 3 =
3 x 7 =	8 x 3 =	3 x 5 =
3 x 1 =	4 x 3 =	8 x 3 =
3 x 5 =	10 x 3 =	9 x 3 =
3 x 2 =	3 x 3 =	3 x 4 =
3 x 8 =	7 x 3 =	6 x 3 =
3 x 4 =	6 x 3 =	3 x 10 =
3 x 10=	2 x 3 =	3 x 1 =
3 x 6 =	9 x 3 =	3 x 3 =

3 x6	3 x3	3 x10	3 x7	3 x9	3 x5	3 x2	3 x4
4 x3	2 x3	6 x3	7 x3	8 x3	3 x3	5 x3	1 x3
9 x3	3 x5	6 x3	3 x7	4 x3	3 x10	8 x3	3 x2

Movement: Writes Multiplication Facts Correctly

Phase: Mixed X 0 - 7

NAME _____ DATE _____ CORRECT _____

ERRORS _____

1 x 7 =	3 x 7 =	5 x 7 =
5 x 5 =	5 x 9 =	4 x 1 =
7 x 4 =	4 x 3 =	2 x 2 =
3 x 8 =	2 x 10 =	3 x 10 =
6 x 2 =	1 x 5 =	6 x 4 =
4 x 5 =	7 x 6 =	2 x 8 =
2 x 7 =	2 x 4 =	1 x 3 =
5 x 4 =	4 x 2 =	7 x 5 =
6 x 3 =	5 x 9 =	2 x 3 =
2 x 4 =	6 x 4 =	4 x 0 =

6 x5	5 x3	7 x7	2 x2	3 x3	0 x5	1 x7	4 x3
1 x9	7 x3	5 x10	3 x5	6 x7	4 x3	2 x8	5 x2
3 x9	5 x3	4 x2	6 x10	2 x6	1 x5	7 x8	2 x3

Movement: Writes Division Facts Correctly

Phase: ÷ 7

NAME_____ DATE_____ CORRECT_____

ERRORS_____

21 ÷ 7 =	7 ÷ 7 =	49 ÷ 7 =
63 ÷ 7 =	35 ÷ 7 =	14 ÷ 7 =
49 ÷ 7 =	56 ÷ 7 =	35 ÷ 7 =
7 ÷ 7 =	28 ÷ 7 =	63 ÷ 7 =
35 ÷ 7 =	70 ÷ 7 =	56 ÷ 7 =
14 ÷ 7 =	21 ÷ 7 =	28 ÷ 7 =
56 ÷ 7 =	49 ÷ 7 =	42 ÷ 7 =
28 ÷ 7 =	42 ÷ 7 =	70 ÷ 7 =
70 ÷ 7 =	14 ÷ 7 =	7 ÷ 7 =
42 ÷ 7 =	63 ÷ 7 =	21 ÷ 7 =

7/42	7/21	7/70	7/49	7/63	7/35	7/7	7/14
7/14	7/42	7/63	7/56	7/21	7/7	7/28	7/35
7/63	7/28	7/21	7/56	7/42	7/14	7/49	7/35

Movement: Writes Answers Correctly.
Phase: Addition Of Proper Fractions.

Correct: _____

Name: _____ Date: _____ Errors: _____

$\frac{1}{2}$	$\frac{2}{4}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{2}{3}$	$\frac{2}{4}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{2}{4}$	$\frac{1}{2}$
$+\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$
$\frac{2}{4}$	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{2}{3}$
$+\frac{1}{4}$	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{3}$
$\frac{1}{2}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{3}{4}$	$\frac{2}{4}$	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{1}{4}$	$\frac{3}{4}$	$\frac{1}{3}$
$+\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{3}$
$\frac{1}{4}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{2}{4}$	$\frac{1}{2}$
$+\frac{2}{4}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{2}{4}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{1}{2}$
$\frac{2}{3}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{2}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{1}{4}$
$+\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{2}{4}$
$\frac{3}{4}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{1}{2}$	$\frac{2}{3}$	$\frac{1}{3}$	$\frac{3}{4}$	$\frac{2}{4}$	$\frac{1}{4}$
$+\frac{1}{4}$	$\frac{1}{3}$	$\frac{1}{3}$	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{1}{3}$	$\frac{2}{3}$	$\frac{1}{4}$	$\frac{2}{4}$	$\frac{3}{4}$

Movement: Writes Answer Correctly.
Phase: Proper Fraction 3/4

CORRECT _____

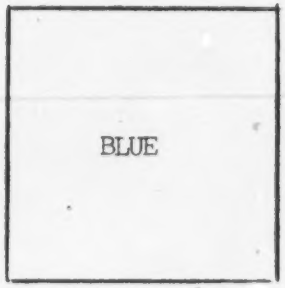
Name: _____ DATE: _____ ERRORS: _____

$\frac{3}{4}$ of 8 =	$\frac{3}{4}$ of 4 =	$\frac{3}{4}$ of 16 =	$\frac{3}{4}$ of 40 =	$\frac{3}{4}$ of 12 =
$\frac{3}{4}$ of 20 =	$\frac{3}{4}$ of 32 =	$\frac{3}{4}$ of 24 =	$\frac{3}{4}$ of 36 =	$\frac{3}{4}$ of 28 =
$\frac{3}{4}$ of 28 =	$\frac{3}{4}$ of 36 =	$\frac{3}{4}$ of 28 =	$\frac{3}{4}$ of 32 =	$\frac{3}{4}$ of 20 =
$\frac{3}{4}$ of 40 =	$\frac{3}{4}$ of 24 =	$\frac{3}{4}$ of 20 =	$\frac{3}{4}$ of 8 =	$\frac{3}{4}$ of 16 =
$\frac{3}{4}$ of 16 =	$\frac{3}{4}$ of 28 =	$\frac{3}{4}$ of 32 =	$\frac{3}{4}$ of 24 =	$\frac{3}{4}$ of 12 =
$\frac{3}{4}$ of 8 =	$\frac{3}{4}$ of 40 =	$\frac{3}{4}$ of 4 =	$\frac{3}{4}$ of 16 =	$\frac{3}{4}$ of 36 =
$\frac{3}{4}$ of 32 =	$\frac{3}{4}$ of 4 =	$\frac{3}{4}$ of 16 =	$\frac{3}{4}$ of 28 =	$\frac{3}{4}$ of 8 =
$\frac{3}{4}$ of 20 =	$\frac{3}{4}$ of 20 =	$\frac{3}{4}$ of 32 =	$\frac{3}{4}$ of 36 =	$\frac{3}{4}$ of 40 =
$\frac{3}{4}$ of 12 =	$\frac{3}{4}$ of 8 =	$\frac{3}{4}$ of 28 =	$\frac{3}{4}$ of 4 =	$\frac{3}{4}$ of 36 =
$\frac{3}{4}$ of 28 =	$\frac{3}{4}$ of 20 =	$\frac{3}{4}$ of 8 =	$\frac{3}{4}$ of 28 =	$\frac{3}{4}$ of 12 =
$\frac{3}{4}$ of 16 =	$\frac{3}{4}$ of 32 =	$\frac{3}{4}$ of 40 =	$\frac{3}{4}$ of 16 =	$\frac{3}{4}$ of 4 =
$\frac{3}{4}$ of 40 =	$\frac{3}{4}$ of 4 =	$\frac{3}{4}$ of 28 =	$\frac{3}{4}$ of 32 =	$\frac{3}{4}$ of 12 =
$\frac{3}{4}$ of 24 =	$\frac{3}{4}$ of 8 =	$\frac{3}{4}$ of 40 =	$\frac{3}{4}$ of 16 =	$\frac{3}{4}$ of 20 =
$\frac{3}{4}$ of 36 =	$\frac{3}{4}$ of 32 =	$\frac{3}{4}$ of 12 =	$\frac{3}{4}$ of 36 =	$\frac{3}{4}$ of 28 =
$\frac{3}{4}$ of 40 =	$\frac{3}{4}$ of 8 =	$\frac{3}{4}$ of 28 =	$\frac{3}{4}$ of 12 =	$\frac{3}{4}$ of 8 =

Movement: Student Names Colors Correctly.

Correct_____

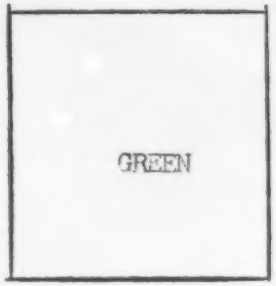
Name:_____ Date:_____ Errors_____

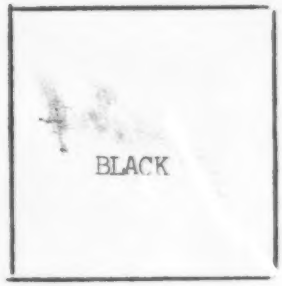


Movement: Student Correctly Points to Named Color

Correct_____

Name:_____Date_____ _____Errors_____





68

69

University Of Washington

Appendix TT

CVUSD/Title VI
1/78

Movement: Student correctly puts one dot in each circle. CORRECT_____

Phase: Eye-Hand Coordination. ERRORS_____

O	O	O	O	O	O	O	O	O	O
O	O	O	O	O	O	O	O	O	O
O	O	O	O	O	O	O	O	O	O
O	O	O	O	O	O	O	O	O	O
O	O	O	O	O	O	O	O	O	O
O	O	O	O	O	O	O	O	O	O
O	O	O	O	O	O	O	O	O	O
O	O	O	O	O	O	O	O	O	O
O	O	O	O	O	O	O	O	O	O
O	O	O	O	O	O	O	O	O	O

Movement: Student correctly draws line between lines connecting 0 to x.

Correct _____

Name: _____ Date _____ Errors _____

Appendix V

CVUSD/Title VI
1/78

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71

Movement: Student traces numbers correctly.

Phase: Trace Numbers.

Directions: Start at X

Correct_____

Name:_____ Date_____ Errors_____